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OF THE

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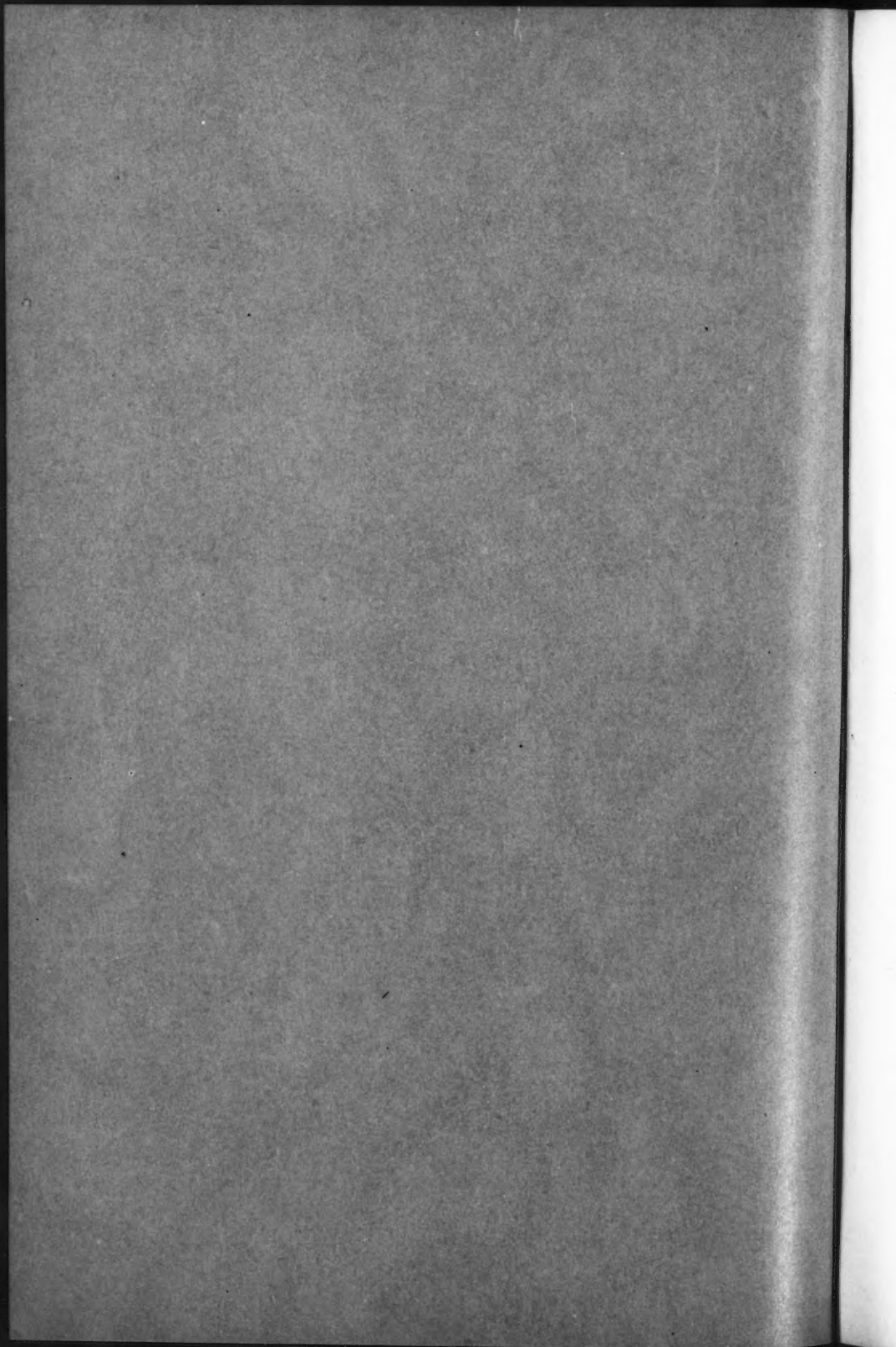
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PROCEEDINGS
OF THE
AMERICAN SOCIETY
OF
CIVIL ENGINEERS
(INSTITUTED 1852)

VOL. XLIV—No. 3

MARCH, 1918

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NEW YORK 1918

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American Society of Civil Engineers

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ON ENGINEERING EDUCATION: Desmond FitzGerald, Onward Bates, D. W. Mead.
TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.
ON THE REGULATION OF WATER RIGHTS: F. H. Newell, W. C. Hoad, John H. Lewis.
TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, F. E. Turneure, J. E. Willoughby.

The Reading Room of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HEADQUARTERS OF THE SOCIETY—33 WEST THIRTY-NINTH STREET, NEW YORK.

TELEPHONE NUMBER.....4600 Vanderbilt.
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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed
in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS

OF THE SOCIETY

February 20th, 1918.—The meeting was called to order at 8:30 P. M.; Vice-President Nelson P. Lewis in the chair; Chas. Warren Hunt, Secretary; and present, also, 184 members and 27 guests.

Mr. V. T. Goggin, Contracting Engineer, Fred T. Ley and Company, Inc., described the construction of Camp Devens, at Ayer, Mass., illustrating his remarks with lantern slides and moving pictures.

Max E. Schmidt, M. Am. Soc. C. E., offered a resolution to the effect that the names of all Members, Associate Members, Associates, and Juniors of the Society, who may lose their lives in the service of the United States during the present war, be placed on a memorial tablet and displayed in perpetuity at a suitable place within the rooms of the Society.

On motion, duly seconded, the resolution was referred to the Board of Direction for consideration and such action as may be deemed proper.

The Secretary announced the following deaths:

CHARLES WEBSTER GAY, of Lynn, Mass., elected Member, May 5th, 1891; died, February 1st, 1918.

CLARENCE BROWNING VORCE, of Farmington, Conn., elected Member May 2d, 1900; died, February 4th, 1918.

Adjourned.

March 6th, 1918.—The meeting was called to order at 8.30 p. m.; Director A. D. Flinn in the chair; Chas. Warren Hunt, Secretary; and present, also, 101 members and 6 guests.

The Chairman announced the appointment of Messrs. William J. Boucher, F. B. Marsh, C. E. Fowler, G. A. Griffin, and H. L. Hurd as Tellers to canvass the ballots on the proposed revision of the Constitution.

The minutes of the Annual Meeting, January 16th, 1918, and of the meeting of February 6th, 1918, were approved as printed in *Proceedings* for February, 1918.

A paper by Floyd A. Nagler, Jun. Am. Soc. C. E., entitled "Verification of the Bazin Weir Formula by Hydro-Chemical Gaugings", was presented by the author and illustrated with lantern slides. The paper was discussed by Frederic P. Stearns, Past-President, Am. Soc. C. E., who also showed some lantern slides. The Secretary announced that he had received written communications on the subject from Messrs. Clemens Herschel and D. A. Molitor. On account of the lateness of the hour it was decided not to read these discussions.

C. F. Brown, M. Am. Soc. C. E., who had intended to address the Society on the subject of unusual drainage problems in Utah, stated that the lantern slides on which his remarks were based had gone astray, and he would like to defer the presentation of the subject until a subsequent meeting.

The following report of the Tellers appointed to canvass the ballots on the proposed revision of the Constitution, was presented:

			"March 6, 1918
"Total number of ballots received.....			2133
"Deduct:-			
"Not entitled to vote.....	30		
"Blank	2		32
			<hr/>
"Yes	546		2101
"No	1555		
	2101		

"Respectfully submitted,

"WILLIAM J. BOUCHER

"F. B. MARSH

"C. E. FOWLER

"G. A. GRIFFIN

"H. L. HURD."

The necessary affirmative vote of two-thirds of all ballots cast not having been received, the Chairman declared the revision lost.

The Secretary announced the following deaths:

OTTO SONNE, of New York City, elected Member, September 7th, 1887; died November 13th, 1917.

JOHN WATERHOUSE, of New York City, elected Member, October 4th, 1899; died February 20th, 1918.

AUGUSTINE WASHINGTON WRIGHT, of Los Angeles, Cal., elected Member, May 5th, 1886; died February 3d, 1918.

Adjourned.

OF THE BOARD OF DIRECTION

(Abstract)

January 14th, 1918.—The Board met at 10 A. M.; President Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Alvord, Craven, Davies, Fay, Flinn, Greiner, Harwood, Herschel, Hill, Humphreys, Kittredge, Khuen, Noble, Rights, Tillson, and Webster.

A Budget prepared by the Finance Committee was presented and referred to the incoming Board of Direction with the recommendation that it be adopted.

Director Flinn, Chairman of the Library Committee, presented a Report of that Committee for the year.*

Director Harwood, Chairman of the Publication Committee, reported progress.

Director Davies reported the receipt of an additional subscription of \$2 500 from the Bethlehem Steel Company for carrying on the work of the Special Committee on Stresses in Railroad Track. The Secretary was instructed to express the thanks of the Society to the Bethlehem Steel Company, and to its President, Mr. Grace, for this gift.

Mr. Davies, Chairman of the Committee on Special Committees, presented a report.†

The report was accepted and its recommendations adopted.

A Progress Report was received from the Committee to Report on the Advisability of the Establishment of Student Branches.‡

The Minutes of the Meetings of the Executive Committee of November 1st, and November 27th, 1917, and January 9th, 1918, were presented, and the actions taken by the Executive Committee at these meetings concerning the War Revenue Act of 1917,§ War Committee of Technical Societies of Engineering Council, and with relation to the Draft of Engineering Students,|| were approved.

* See page 247.

† See page 244.

‡ *Proceedings*, Am. Soc. C. E., February, 1918, p. 144.

§ *Proceedings*, Am. Soc. C. E., November, 1917, p. 672.

|| *Proceedings*, Am. Soc. C. E., December, 1917, pp. 759-760.

The Report of the Board of Direction prepared by the Executive Committee was presented and adopted for presentation to the Annual Meeting.*

The Secretary reported that the property of the Society at 220 West 57th Street, had been loaned to the Food Administration of the United States in accordance with authority of the Executive Committee, and under certain restrictions which had been agreed to by Mr. Hoover. The action of the Executive Committee in regard to the Society property was approved, with the thanks of the Board for its action.†

A report was received from the Committee to Recommend the Award of Prizes.

It was voted that the recommendations of the Committee be approved and the medals and prizes were awarded by the Board in accordance therewith.‡

The incoming President was authorized to appoint three delegates to represent the Society at a meeting of the National Security League to be held in Chicago, February 21st-23d, 1918.

A report of work accomplished by the Naval Consulting Board, signed by Alfred Craven and A. M. Hunt, representatives of this Society on that Board, was presented, and accepted with the thanks of the Board.§

Resolutions adopted by the Canadian Society of Civil Engineers (now the Engineering Institute of Canada) were presented and ordered printed in *Proceedings*.||

Clemens Herschel was appointed as one of the representatives of this Society on the United Engineering Society for three years to succeed himself.

J. Waldo Smith was re-appointed to serve another term as one of the representatives of the Society on the Engineering Foundation.

The resignation of J. D. Galloway as one of the representatives of this Society on Engineering Council, on account of military service, was reported, and also that President Pegram had appointed Charles F. Loweth to fill his unexpired term.

Certain rules adopted by Engineering Council under which additional societies may become members of that body were considered. The following resolution was adopted:

"That the communication from the Secretary of Engineering Council be received, and that the Secretary of this Society be instructed to reply that this Society prefers to defer final action until a more definite scheme of financing be developed in harmony with the plans of the United Engineering Society, and that a Committee of this Society be

* *Proceedings*, Am. Soc. C. E., January, 1918, p. 24.

† *Proceedings*, Am. Soc. C. E., January, 1918, p. 9.

‡ *Proceedings*, Am. Soc. C. E., February, 1918, p. 110.

§ *Proceedings*, Am. Soc. C. E., January, 1918, p. 3.

|| *Proceedings*, Am. Soc. C. E., February, 1918, p. 143.

appointed by the chair to confer with the United Engineering Society in the effort to develop a plan for financing."

The President subsequently appointed Messrs. Kittredge, Davies, and Hunt, as such Committee.

The Constitution of the Pittsburgh Association of Members of the American Society of Civil Engineers, which was formally organized November 27th, 1917, was presented and approved.

Messrs. Parker and Aaron were appointed counsel for the Society.

A letter was presented from William H. Wiley, M. Am. Soc. C. E., calling attention to the proposed formation of the American Academy of Engineers.

The following resolution was offered by Dr. Humphreys, seconded by Mr. Alvord, and adopted:

"Resolved: That it is the opinion of the Board of Direction of the American Society of Civil Engineers that such an organization as is proposed under the title of 'Academy of Engineers', if there is a field for its activities, should be organized under the initiative of the National Engineering Societies, and particularly that the membership of an Academy of Engineers should not be made up by self-appointment."

A letter was presented in behalf of General Crozier, of the Ordnance Department, thanking the Secretary for his patriotic efforts in supplying draftsmen for that Department.

A report of the Tellers to Canvass the Final Suggestions in the matter of the Nominating Committee, Messrs. Noble, Rights, and Flinn, was received and ordered presented to the Annual Meeting.*

Action was taken in regard to members in arrears for dues.

The resignations of 9 Members, 28 Associate Members, 2 Associates, and 7 Juniors, were accepted.

Ballots for membership were canvassed, resulting in the election of 8 Members, 38 Associate Members, 9 Juniors, and the transfer of 15 Juniors to the grade of Associate Member, and 1 Junior to the grade of Associate.

Thirteen Associate Members were transferred to the grade of Member.

Applications were considered and other routine business transacted.

Adjourned.

January 15th, 1918.—The Board met at 11.30 A. M.; Vice-President Webster in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Alvord, Fay, Flinn, Greiner, Hill, Khuen, Kittredge, and Noble.

A report from the Membership Committee was received and acted upon.

Adjourned.

* *Proceedings*, Am. Soc. C. E., February, 1918, p. 111.

January 16th, 1918.—The Board met at 1 P. M., at the Headquarters of the Society, 33 West 39th Street, New York City, at the time of the Annual Meeting, as required by the Constitution (Art. VI, Sec. 7); President Talbot in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Alvord, Davis, Fay, Flinn, Herschel, Hill, Humphreys, A. M. Hunt, Kittredge, Ketchum, Khuen, Lewis, Noble, Pegram, Rights, Tillson, Wagner, and Webster.

A Budget for the year 1918 prepared by the Finance Committee of 1917, and which was recommended to the incoming Board for adoption, was presented and adopted.

The following Standing Committees of the Board were appointed: On Finance: George W. Kittredge, Chairman, Alex. C. Humphreys, George S. Webster, Frederic H. Fay, and Nelson P. Lewis; on Publications: Lewis D. Rights, Chairman, Frederick C. Noble, Andrew M. Hunt, John F. Coleman, and Milo S. Ketchum; on Library: Alfred D. Flinn, Chairman, Lewis D. Rights, Samuel T. Wagner, Richard Khuen, Jr., and Chas. Warren Hunt; and Committee on Special Committees: John W. Alvord, Chairman, George W. Tillson, and Edwin Duryea.

The President announced that the next business was the election of a Secretary.

Mr. Hunt retired.

Chas. Warren Hunt was nominated and unanimously elected Secretary.

Mr. Hunt was recalled and informed of his election.

It was ordered that the Annual Convention of 1918 be abandoned on account of the war.

The time was fixed for the next two meetings of the Board of Direction.

Adjourned.

March 12th, 1918.—The Board met at 10.25 P. M., immediately after the adjournment of the Membership Committee; President Talbot in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Humphreys, A. M. Hunt, Kittredge, Lewis, Pegram, Rights, Tillson, and Wagner.

Ballots for membership were canvassed resulting in the election of 13 Members, 51 Associate Members, and 15 Juniors, and the transfer of 7 Juniors to the grade of Associate Member.

Seventeen Associate Members were transferred to the grade of Member.

A Report from the Membership Committee was received and acted upon.

Adjourned.

SOCIETY ITEMS OF INTEREST

ENGINEERING COUNCIL

Definition Adopted February 21st, 1918

Engineering Council is an organization of National Technical Societies of America created to provide for consideration of matters of common concern to engineers, as well as those of public welfare in which the Profession is interested, in order that united action may be made possible. The organizations at present represented in Engineering Council are the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, known as the Founder Societies, and having a membership of 33 000.

General Statement

As to Past and Proposed Activities of Engineering Council

Prepared by the Secretary and Approved by the Executive Committee

Engineering Council held its first meeting on June 27th, 1917. In the months which have elapsed, useful services have been rendered to the Government, to engineering societies, and to individuals, and progress has been made in perfecting Council's organization. Offices have been furnished free of charge in the Engineering Societies Building, New York City, the focus of engineering activities in America. A permanent executive officer, with the title of Secretary, has been engaged; he entered upon his duties on January 1st. Several important committees have been created, and have accomplished much.

On February 21st, 1918, the first annual meeting was held. The following officers were elected: J. Parke Channing, Chairman; Harold W. Buck, First Vice-Chairman; George F. Swain, Second Vice-Chairman; Alfred D. Flinn, Secretary. Committees were appointed as follows:

Executive Committee.—The Chairman, the two Vice-Chairman, D. S. Jacobus, Calvert Townley, and George J. Foran.

Finance Committee.—E. W. Rice, Jr., Chairman, Charles F. Loweth, Sidney J. Jennings, and D. S. Jacobus.

Rules Committee.—J. Parke Channing, Chairman, Clemens Herschel, Nathaniel A. Carle, and Irving E. Moulthrop.

Public Affairs Committee.—Charles Whiting Baker, Chairman, George F. Swain, Benjamin B. Thayer, E. W. Rice, Jr., and Charles E. Skinner.

American Engineering Service.—George J. Foran, Chairman, George C. Stone, Alfred D. Flinn, Addams S. McAllister, and Edward B. Sturgis, Secretary.

War Committee of Technical Societies.—D. W. Brunton, Chairman, Arthur H. Storrs, Secretary, James M. Boyle, Nelson P. Lewis (American Society of Civil Engineers), Edmund B. Kirby (American Institute of Mining Engineers), A. M. Greene, Jr., R. N. Inglis (American Society of Mechanical Engineers), Harold W. Buck, Addams S. McAllister (American Institute of Electrical Engineers), Dana D. Barnum, E. C. Uhlig (American Gas Institute), Joseph Bijur, Charles A. Doremus (American Electrochemical Society), Louis B. Parks, Preston S. Milar (Illuminating Engineering Society), Christopher R. Corning, George C. Stone (Mining and Metallurgical Society of America), Henry Torrance, F. E. Matthews (American Society of Refrigerating Engineers).

Fuel Conservation Committee.—L. P. Breckenridge, Chairman, Ozni P. Hood, Secretary, Robert H. Fernald, Charles R. Richards, Charles L. Edgar, Carl Scholz, David Moffat Myers, Edwin Ludlow, and Harold W. Buck.

Patents Committee.—A Patents Committee, to investigate reforms in the United States patent system and in the use of experts in litigation wherein the validity of patents or other technical matters are involved, was also created, but the names of its members cannot yet be announced. The committee was instructed to co-operate with any committee of the National Research Council, and with committees of other technical societies organized for a kindred purpose.

Limitation of financial resources has been and still is one of the greatest handicaps. At the beginning of 1918, an appropriation of \$16 000 by the United Engineering Society, contributed equally by the four Founder Societies, became available for the period ending October 31st, 1918. Although this sum provides for the expenses of the Secretary's office, for inaugurating several permanent lines of service, and for a few special items in connection with the War, it is far from adequate. Engineering Council is still forced to go slowly on work already undertaken, and to decline or defer other meritorious projects. That Engineering Council has accomplished as much as it has is due chiefly to the fact that individuals, societies, and Government bureaus have informally contributed services and means. Additional income must be had if Engineering Council is to bring to pass within a reasonable time many of the things rightfully expected of it for the benefit of professional engineers, the country, the Government, and the public.

Restriction of membership in Engineering Council to the four societies just mentioned is not intended. Quite to the contrary, it is planned and earnestly desired that other national technical societies shall become affiliated, thus making Engineering Council truly representative of the hundred thousand engineers in all branches of the profession throughout the United States. Conditions and methods for

the admission of additional societies have been developed. Henceforth, a chief aim of Engineering Council will be to increase the number of member societies, and thus gain, not only an enlargement of its capacity for usefulness along its chosen lines, but also greater technical and financial support.

So extensive is the field of possible activity for Engineering Council that even yet it is unwise to set its bounds. Nevertheless, some of the proposed activities may now be outlined. Foremost among these is the fostering of a sense of solidarity throughout all divisions of the profession in all parts of the country, and increasing the sense of common interest and of the strength that results from unification. To this end, subordination to the general welfare of the preferences and pride of organizations and of persons may be necessary; but it is confidently expected that, even through difficult places, the right paths will be found. Patience and good sense will win full and effective co-operation. Publicity of a high order, but of a practical sort, must be devised in order that both engineers and the public may be informed, not only of engineering achievements in physical work, but also of the services which pertain peculiarly to engineers, in mental realms, those which they are performing and those which they should perform. Engineers and engineering must be made more comprehensible to the people up and down the land, and kept instructively and interestingly in the public prints. A most important service is the standardization of definitions, methods, requirements, and tests for all varieties of engineering materials and work. Others are the improvement of the methods and requirements of engineering colleges, the standardizing of the meanings and values of the degrees given to graduates, and the broadening of the engineer through knowledge of humanitarian subjects, in which other professional men take interest.

Mutual helpfulness in getting the right engineer for the empty niche of usefulness and in finding an empty niche for the unemployed engineer, or for the one seeking advancement, has for years been a need of engineering societies, widely voiced, especially by the younger men. Many endeavors have been and are being made to meet this need, with more or less success; but most of them have been limited. Engineering Council has already given this matter much thought, and has put it in the hands of the American Engineering Service, one of its Committees. To meet these demands this committee has been assembling in its offices in the Engineering Societies Building, New York, comprehensive lists and much detailed information concerning engineers in all branches of the profession. During the past few months, there have been supplied to Government departments and bureaus several thousand names of engineers, from which men have been selected to fill a great variety of positions in uniformed and civilian service for the Army, the Navy, and other branches of the

Government's activities in connection with the War, as well as for manufacturers and contractors engaged on Government war work. Hitherto, these war demands have absorbed most of the energies of this committee and its staff, but, incidentally, there have been accumulated great masses of live material which, in the near future, can be re-cast into a suitable mould of classification, and indexed for permanent use. On methods of classifying and indexing, the committee has already done not a little work. It is the intention to discover what has been done by others and to combine and strengthen all useful systems so as to secure the greatest benefits for engineers, for employers, and for local, State, and National governments. It is the aim, ultimately, to create a complete, skilfully classified catalogue of all American professional engineers. This body of information will have many obvious uses, as well as others that will be discovered.

It has become evident that, although numerous engineering societies are occupying limited fields efficiently, and although some of these fields are extensive, there are large sectors of the domain of the engineer which are either only weakly held, or are usurped by others. This condition has arisen partly from specializing tendencies, among societies as well as among individuals. Until the present time, there has been no central agency capable of entering these sectors and competent to speak for the profession at large; no duly constituted representative to learn of the share in local civic and governmental enterprises which should be the engineer's, to claim it for him, and to see that he gets it; no organization to harmonize the action of the profession on similar questions in different localities; no interpreter to the public of the engineer, his work, his ideals, and his methods; no body to develop meritorious projects for the general good of the profession or for the benefit of the public; no one constantly on guard to detect and oppose objectionable schemes and tendencies. To fill these gaps is the great aim of Engineering Council; not by demolishing any useful existing agencies, but by building these into a well-proportioned and thoroughly furnished structure. Of course, time will be required for establishing and perfecting such an organization, with its necessary local branches covering all the United States.

Engineers are organizers, and should be directing their abilities as such to the greater service of the nation. No better demonstration of the need of such a centralizing body as Engineering Council could be had than the multiplicity of existing engineering organizations, and especially the manifestation during recent months of this tendency to segregation exhibited in efforts to serve the Government in connection with the War. Order is slowly being brought out of this confusion, but, if Engineering Council could have been well established before the beginning of the War, it would have become at once the connecting link between the Government and engineers, securing results quickly,

directly, economically, and in an orderly manner. While contributing its best endeavors to the winning of an early and complete victory, Engineering Council must be shaping its organization so as to be prepared to aid engineers in taking the leading part which must be theirs in the years following the conclusion of peace.

Unselfish service and mutual helpfulness must be the test requirements for all the undertakings of Engineering Council. Offensive political or business activities must be avoided, and the selfish aims of groups or individuals must not be fostered. If the work roughly outlined is carried forward in this spirit, no fears need be entertained for the profession's ethics, its honor, or the standing of the engineer in the community.

Compensation of Professional Engineers and Engineering Assistants on Railroads

In a communication, presented to the Railroad Wage Commission, in Washington, on February 28th, 1918, Engineering Council asks that consideration be given to the compensation of professional engineers and engineering assistants on railroads (as distinguished from locomotive enginemen and other operatives of engines), and presents the following arguments:

Engineers and engineering assistants have no union or similar organization to urge increases of salaries or betterment of conditions, as have the skilled and unskilled labor employees. Except in a few individual cases, no increase in compensation of technical employees of railroads has been made since 1914, but, within that period large increases have been granted to skilled and unskilled labor. Owing to the depreciation of the dollar, these technical employees, therefore, have suffered a great reduction in income. Applications for increases, even when based on the increased cost of living, have been refused on the ground that such men can be replaced and that they must stand war privation, although no such theory has been applied to the case of the trainmen, who, also, as individuals, can be replaced. As a class, neither trainmen nor technical employees can be replaced at present.

The following examples of discrepancies in compensation are given: Of thirty-one classes of railroad employees, concerning whom information is given in a letter from the Bureau of Railway Economics, quoting the Interstate Commerce Commission report for the year ending June 30th, 1915, twelve classes on the average received more, and eighteen classes less than the assistant engineers and draftsmen; those of the class receiving the highest pay (road passenger engineers and motormen) obtained nearly 100% more. Road freight engineers and motormen, and road passenger conductors were paid about 66% more; foremen, boilermakers, brakemen, firemen, and helpers received approximately the same pay as the assistant engineers and draftsmen. It is

probable that, if figures for 1917 were available, they would be much lower in proportion.

Many railroad engineers, draftsmen, etc., who have secured industrial employment have thereby increased their salaries from 20 to 150%, but, of course, tables of averages, general statements, and specific examples must be considered in connection with many other data. Local conditions affect rates of pay. Railroad managements differ in their policies on this matter; during the past year and a half some have fully, or in a measure, met the conditions which have arisen. Rates of pay for steady employment with a railroad company cannot be compared directly with rates for industrial engagements, often of limited duration and involving extra expense.

In conclusion, attention is called to the fact that upon the intelligence, skill, and efficiency of the technical engineers the maintenance, operation, and progress of the country's railroad systems largely depend. The men deserve just compensation, and in order to inspire them to the services which will yield the highest benefits to the community, as well as to the railroads, they should receive liberal pay.

Report of Committee on Special Committees

"30 Church Street, New York,

"January 10, 1918.

"TO THE BOARD OF DIRECTION,
AMERICAN SOCIETY OF CIVIL ENGINEERS,
NEW YORK, N. Y.

"DEAR SIRS:

"Your Committee on Special Committees begs to submit a report on the work of the several Special Committees during the past year, as follows:

"The expenditures of all the Special Committees during the past year have been materially less than the amounts provided in the budget for their use.

"The following figures show the amounts appropriated, the amounts expended, and the balance unexpended, for each of the Special Committees:

"Special Committee on	Appropriated.	Expended.	Balance.
"Steel Columns and Struts.....	\$2 400.00	\$718.37	\$1 681.63
Engineering Education
Materials for Road Construction...	800.00	214.22	585.78
Bearing Value of Soils.....	959.25	291.97	667.28
Regulation of Water Rights.....	450.00	40.00	410.00
Valuation of Public Utilities.....	250.00	250.00
Stresses in Railroad Track.....	5 253.91	2 812.07	2 441.84
Concrete and Reinforced Concrete (expenses carried over from pre- vious years).....	817.83	817.83
Totals.....	\$10 930.99	\$4 894.46	\$6 036.53

"There may, however, be other accounts received from the Special Committees for payment after January 1st, which would be properly chargeable to last year's work, but in all probability such accounts, if any, will be very small.

"Of the work carried on by the individual Special Committees, we would report as follows:

1. On *Engineering Education*.

"We have received from Mr. Desmond FitzGerald, Chairman of this Special Committee, the following advice:

"I expect the final report of our Committee will come some time in the Autumn of 1918, and I will make a progress report at the annual meeting. Dr. Mann's special report is now completed, and will perhaps be started in the press during January. It is a great report, not in size, but in matter, and I expect will be epoch making and of great value for the schools. It has been greatly reduced in bulk, but covers the ground in a masterly manner.'

"This Special Committee asks for no appropriation, as the expenses, whatever they have been, have been borne by the Carnegie Foundation, by whom Dr. Mann was employed. We have understood that Dr. Mann has terminated his engagement with Carnegie Foundation and has taken up work elsewhere, so that the Special Committee can hardly look to Dr. Mann to complete its work, unless the subject is covered completely by Dr. Mann's report to which Mr. FitzGerald refers.

"2. On *Steel Columns and Struts*.

"The final report of the Special Committee is published in the December *Proceedings*, and the Chairman, Mr. Lewis D. Rights, asks for its discharge at the Annual Meeting. It seems to us that it would be a mistake to discharge this Special Committee at the Annual Meeting, and we think their final report should be accepted at the Annual Meeting, and the matter of final discharge of the Special Committee left in the hands of the Board of Direction for action at such time as the discussion of the final report is completed. Mr. Rights suggests that there may be expenses incurred in connection with the discussion and the closing of the work of the Committee, and asks for an appropriation for this purpose of \$500, though he does not anticipate that this amount will be expended. In order, however, to reduce so far as possible the limits of expenditure, we recommend the appropriation of only \$250, to be available in the event that it should be required for the completion of the work of this Special Committee.

"3. On *Materials for Road Construction*.

"The final report of this Special Committee is also published in the December *Proceedings*, and Professor A. H. Blanchard, Secretary of the Committee, advises that the Committee does not expect to be continued and makes no request for an appropriation for expenses for 1918. Our recommendation in reference to this Special Committee is that an amount of \$100 be appropriated for any possible expenses which the Committee may incur in connection with the work arising from the discussion of the report, although it is probable that even this small amount will not be expended.

"4. On Bearing Value of Soils for Foundations.

"We have been in correspondence with Mr. Robert A. Cummings, Chairman of this Special Committee, and have also had a personal interview with him regarding the procedure of the Committee during the year 1918. Mr. Cummings is of the opinion (and we agree with him) that the work of this Special Committee is in such a condition that no special or particular benefit will be obtained by the Society by continuing the work of this Committee during the current year or until the termination of the war, and we recommend that there be no appropriation made for the work of this Special Committee other than a nominal amount of, say, \$100 for such expenses as may possibly be incurred in keeping the Committee alive.

"5. On Regulation of Water Rights.

"Professor F. H. Newell, Chairman, has submitted a brief progress report, which will be presented at the Annual Meeting, and which indicates that little, if any, actual work has been done by this Special Committee. This report contains the following:

"It is recognized that progress must necessarily be slow, especially during this period when the minds of Engineers and of their associates are turned almost exclusively to war conditions.'

"He asks that the balance unexpended of the appropriation for 1917 remain available for 1918. Such an arrangement is contrary to all previous rulings of your Board. In our opinion, it is not likely that this Special Committee will be able to accomplish effective work during the duration of the war, and, in that case, we would recommend that a sum not exceeding \$100 be appropriated simply with the idea that this Special Committee be kept alive until the termination of the war and for the payment of such necessary expenses as may be incurred in this process.

"6. On Stresses in Railroad Track.

"This Special Committee has continued its work during the past year and will submit a progress report at the Annual Meeting. We have had correspondence with Mr. Charles S. Churchill in relation to the needs of this Committee, and we are advised that the balance unexpended of the special fund contributed by the various steel manufacturers, together with the balance remaining in the hands of the American Railway Engineering Association, will be adequate to pay the expenses of this Committee's work during the year 1918, particularly as Professor Talbot indicates that the question of obtaining assistance to carry on the work, due to war conditions, is likely to curtail materially the extent of the work to be done. We recommend that this Special Committee be empowered to draw upon the special fund in the hands of the Society to the extent of the amount of money remaining to the credit of this Committee, in which case there will be no draft upon the general funds of the Society.

"The Chairman of this Special Committee, Professor A. N. Talbot, will unquestionably be chosen as the next President of the Society. We have communications from Mr. Charles S. Churchill, Mr. A. S. Baldwin, and Mr. W. M. Dawley, representing the membership of the Joint Committee of the American Society of Civil Engineers and the American Railway Engineering Association on Stresses in Railroad Track.

requesting that every effort should be made to retain Professor Talbot as Chairman of this Committee. We have also received intimation that Professor Talbot would be willing to retain the Chairmanship, and, in addition to his duties as President, perform the duties involved as Chairman of this Special Committee. We strongly endorse this request and heartily recommend to the incoming Board of Direction, that Professor Talbot be retained as Chairman of this Special Committee, so that the policy and general plan of the work may remain unchanged.

"Generally speaking, we feel that under the existing war conditions the active work of the Special Committees, remaining alive, should be curtailed to the greatest extent possible, not only to reduce the expenditure of funds of the Society, but in order to conserve the personal efforts of the members of the several Special Committees, many of whom are actively engaged in governmental work at this time.

"During the past year there has been referred to the Committee on Special Committees a request for the appointment of a Special Committee to investigate the matter of creosoted wood stave pipe for hydraulic and irrigation work. We have corresponded with a number of members whom it was suggested were particularly interested in this subject, and have received diverse replies from them. We recommend that the whole matter of appointment of such a Special Committee be referred, with all correspondence on the subject to the incoming Committee on Special Committees for further consideration.

"Respectfully submitted

"GEO. W. TILLSON

"W. L. DARLING

"J. V. DAVIES

"Chairman."

Report of Library Committee

"January 14th, 1918.

"TO THE BOARD OF DIRECTION

AMERICAN SOCIETY OF CIVIL ENGINEERS:

"Through changes in the management of the Society's affairs and its property during recent years, and especially during the year 1917, the provisions of the Constitution for a Library Committee have become almost a dead letter. Some of the duties are performed by the Secretary and the Board of Direction, and others have largely passed to the Library Board of the United Engineering Society. The whole matter of the year's events as to the Society's headquarters and its library are well covered in the Annual Report of the Board of Direction, prepared by the Secretary. It is, therefore, unnecessary to repeat a statement of these matters in a separate report.

"For the year 1917 the striking events are the removal from the Society's previous home in 57th Street to its new quarters in the Engineering Societies Building, the temporary use of the former headquarters by the Food Conservation Commissioner, the transfer of 67 000 volumes of the Society's library into the Engineering Societies Library, and the donation to the Cleveland Association of Members of the

American Society of Civil Engineers of 22 000 volumes which were duplicates of volumes already in the Engineering Societies Library.

"As to the library, the most important work now to be done is the complete amalgamation of the several collections of books into one well-arranged, thoroughly indexed, engineering library at the earliest practicable date.

"Respectfully submitted,

"GEORGE A. HARWOOD,

"LEWIS D. RIGHTS,

"J. V. DAVIES,

"CHAS. WARREN HUNT,

"ALFRED D. FLINN,

"*Library Committee,*

"By ALFRED D. FLINN,

"*Chairman.*"

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

April 3d, 1918.—8.30 P. M.—At this meeting George W. Fuller, M. Am. Soc. C. E., will give an informal talk on "Emergency Construction Work Due to War Conditions", illustrated with lantern slides. Mr. Fuller will outline the construction work necessitated by the War, with special reference to the building of cantonments; the preliminary organization; the urgent importance of proper engineering direction; the establishment of the Cantonment Division with head reporting directly to the Secretary of War; civilian assistance; the style of contract for construction, with its merits and defects; the work connected with water supply, sewerage, heating, lighting, roads, etc.; and will present some practical lessons taught by actual experiences with emergency work.

April 17th, 1918.—8.30 P. M.—Instead of the usual presentation and discussion of a professional paper, there will be substituted a joint meeting of engineers, at which the John Fritz Medal will be presented to J. Waldo Smith, M. Am. Soc. C. E., for "Achievement as engineer in providing the City of New York with a supply of water."

John J. Carty, Past-President, Am. Inst. Electrical Engineers, and President of the Board of Award will preside. Addresses will be made by the Hon. A. T. Clearwater and by Nelson P. Lewis, Vice-President, Am. Soc. C. E., and the medal will be presented to Mr. Smith by Ambrose Swasey, Past-President, Am. Soc. Mechanical Engineers and of the Board of Award.

Ladies are cordially invited to attend this meeting.

May 1st, 1918.—8.30 P. M.—A regular business meeting will be held, and a paper by J. A. L. Waddell, M. Am. Soc. C. E., entitled "The Economics of Steel Arch Bridges", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL CONVENTION ABANDONED

The Board of Direction has decided that the Annual Convention of 1918 shall be abandoned, on account of War Conditions. Among the reasons for this action are: the absence of many members of the Society in the service of the country; the inappropriateness of social functions at this time; the limitation of transportation facilities; and the advisability of the practice of economy along all lines.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that if it were generally known to engineers that such assistance could be had, many would avail themselves of it.

On October 1st, 1916, the Library of the American Society of Civil Engineers ceased to exist as such, and was merged in the Engineering Societies Library, adding 67 000 volumes to the collection, which comprises also the former libraries of the American Institute of Mining Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, and now has a total of 133 000 volumes and pamphlets. Containing, as the Library now does, the special collections mentioned, its scope is broadened, and, as it receives an unusually large number of technical periodicals, it is well equipped to continue the service formerly rendered by the Society Library.

The Engineering Societies Library offers this service at a cost, which is trifling compared with the value of the time of an engineer who personally looks up such matters, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the Library is prepared to furnish photographic copies of the material at a small price per page. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

The Library is also able to provide translations of articles in foreign languages when desired.

Requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written

communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 35 of the Year Book for 1917.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association, Organized 1905.

Jerome Newman, President; Nathan A. Bowers, Secretary-Treasurer, 502 Rialto Building, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at noon, every Wednesday, at the Engineers' Club, 57 Post Street, where special tables are reserved for members and guests of the Association.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

Colorado Association, Organized 1908.

Robert Follansbee, President; L. R. Hinman, Secretary-Treasurer, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour

and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesday at 12.30 P. M., at Daniel's and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

(Abstract of Minutes of Meeting)

December 8th, 1917.—The meeting was called to order at the Denver Athletic Club; Arthur O. Ridgway in the chair; L. R. Hinman, Secretary.

The minutes of the meeting of November 10th, 1917, were read and approved.

Mr. Thomas W. Jaycox, representative of the Association on the Joint Committee on Improvement of Roads adjacent to Denver, reported progress and outlined plans for future work of the Committee.

Mr. Charles W. Comstock, Chairman of the Committee on War Taxes, reported for that Committee. The subject was discussed by Messrs. Vincent, Jaycox, Houston, Field, and Hinman, and resolutions were adopted and ordered sent to the Society, the other Local Associations, and to the Colorado members of Congress.

Owing to the absence of Milo S. Ketchum, Chairman, the presentation of the report of the Committee on Student Branches of the Society was postponed until the next meeting.

Messrs. Jewett, Northam, and Olds were appointed as the Entertainment Committee for the next meeting.

Addresses were made by Messrs. J. M. Gaylord, Thomas W. Jaycox, and J. C. Ulrich on "Experiences of the United States Reclamation Service with Large Reservoir Outlets", "Experiences with Reservoir Outlets near Creede, Colo.", and "Experiences with Reservoir Outlets in the San Luis Valley, Colorado", respectively. These addresses were illustrated with lantern slides, and the subject was generally discussed by the members present.

Adjourned.

Atlanta Association, Organized 1912.

B. M. Hall, President; W. C. Spiker, Secretary-Treasurer, 1408 Candler Building, Atlanta, Ga.

Baltimore Association, Organized 1914.

Mason D. Pratt, President; Charles J. Tilden, Secretary-Treasurer, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

Harry Fuller, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Detroit Association, Organized 1916.

T. A. Leisen, President; Clarence W. Hubbell, Secretary, 2348 Penobscot Building, Detroit, Mich.

The regular meetings of the Association are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Association, Organized 1916.

A. P. Davis, President; John C. Hoyt, Secretary-Treasurer, U. S. Geological Survey, Washington, D. C.

Duluth Association, Organized 1917.

F. E. House, President; Walter G. Zimmermann, Secretary, Wolvin Building, Duluth, Minn.

The regular meetings of the Association are held at noon on the third Monday of each month (usually at the Kitchi Gamma Club), with luncheon, followed by a short business session and the reading of papers. Visiting members of the American Society of Civil Engineers can secure from the Secretary definite information relating to the meetings, at which they will be welcomed. The Annual Meeting is held on the third Monday in May.

(Abstract of Minutes of Meeting)

February 19th, 1918.—The meeting was called to order at the Kitchi Gamma Club; President F. E. House in the chair; W. H. Woodbury, acting as Secretary; and present, also, 22 members and 7 guests.

The Committee on the Organization of an Engineers' Club reported that a list of all the local members of the National Societies had been compiled, and suggested that an informal meeting be called of all the members of the Profession in Duluth and vicinity to discuss the organization of a club which would include all men engaged in engineering work. On motion, duly seconded, the suggestion was adopted, and the Committee was authorized to act accordingly.

The proposed revision of the Constitution of the Society was discussed, but no formal action by the Association was taken, the opinion, however, being strongly in favor of its adoption.

The discussion of the paper on "Sandstone Concrete", by Major T. F. McGilvray, which was presented at the January meeting, was opened by Mr. Clarence Coleman, and the subject was discussed by other members and guests present.

Adjourned.

Illinois Association, Organized 1916.

A. S. Baldwin, President; Edgar S. Nethereut, Secretary-Treasurer, 705 Michigan Ave., Evanston, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Louisiana Association, Organized 1914.

W. B. Gregory, President; Charles W. Okey, Secretary, Tulane University, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nebraska Association, Organized 1917.

George L. Campen, President; Homer V. Knouse, Secretary-Treasurer, 115 City Hall, Omaha, Nebr.

Regular meetings of the Association are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

An "Engineers' Round Table" is reserved daily for luncheons, at Courtenay's Restaurant, 17th and Douglas Streets, Omaha, to which all engineers are invited. Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

Northwestern Association, Organized 1914.

P. E. Thian, President; Ralph D. Thomas, Secretary, 508 South First Street, Minneapolis, Minn.

The meetings of the Association are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month. Information as to the time and place of such meetings will be furnished on application to the Secretary.

Philadelphia Association, Organized 1913.

Henry H. Quimby, President; C. W. Thorn, Secretary, 1313 South Broad Street, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the First Monday in January, April, and October, the last being the Annual Meeting.

Pittsburgh Association, Organized 1917.

Richard Khuen, Jr., President; Charles M. Reppert, Secretary-Treasurer, 422 City-County Building, Pittsburgh, Pa.

The Annual Meeting of the Association is held on the first Monday in October. The time and place of other meetings are not fixed, but this information will be furnished on application to the Secretary.

(Abstract of Minutes of Meetings)

November 27th, 1917.—The meeting to organize the Association was called to order by Richard Khuen, Jr.; Charles M. Reppert, acting as Secretary; and present, also, 49 members of the Society.

The following officers were elected: President, Richard Khuen, Jr.; Vice-President, Robert A. Cummings; and Secretary-Treasurer, Charles M. Reppert.

A Constitution was prepared and unanimously adopted by the meeting, and the Secretary was ordered to submit a copy to the Board of Direction of the Society for consideration and approval.

A Sub-Committee, consisting of Messrs. Thomas Fleming, Jr., Paul Didier, and T. Sidney White, was appointed to prepare and submit a draft of By-Laws, and this Committee was instructed to report at a meeting of the Association to be called in two months.

On motion, duly seconded, it was decided to hold the next meeting of the Association on January 9th, 1918.

Adjourned.

January 9th, 1918.—The meeting was called to order at the Builders' Exchange Auditorium; President Khuen in the chair; C. M. Reppert, Secretary; and present, also, 38 members.

The minutes of the meeting of November 27th, 1917, were read and approved.

The report of the Committee, consisting of Messrs. Fleming, Didier, and White, appointed to draft By-Laws for the Association was presented. The report was discussed, and, on motion, duly seconded, the By-Laws as a whole and as amended were adopted.

The Secretary read a letter from the Chairman of the House Committee of the Engineers' Society of Western Pennsylvania relative to the availability of the auditorium in the Union Arcade Building as a place of meeting, and, after discussion, it was decided, on motion, duly seconded, to refer the question of arrangements for an auditorium to the Executive Committee.

The proposed revision of the Constitution of the Society was discussed by many of the members present. On motion, duly seconded, recommendations expressing the sense of the meeting in regard to a number of the provisions were adopted, and the Secretary was instructed to send an extract of the minutes of the meeting relative to this matter to the Secretary of the Society to be read at the Annual Meeting of the Society on January 16th, 1918, prior to the discussion of the subject.

On motion, duly seconded, the President was requested to make such use of the recommendations adopted by the Association as he might deem advisable.

President Khuen announced the appointment of Messrs. Fleming, Dilworth, and Talbot as a Committee on Activities.

On motion, duly seconded, it was decided to hold the next meeting of the Association during the month of February, at the call of the Executive Committee.

Adjourned.

Portland, Ore., Association, Organized 1913.

Philip H. Dater, President; C. P. Keyser, Secretary, 1147 East Yamhill Street, Portland, Ore.

St. Louis Association, Organized 1888 (Constitution Approved by Board, 1914).

J. A. Ockerson, President; C. M. Daily, Secretary-Treasurer, 34 East Grand Avenue, St. Louis, Mo.

The Annual Meeting of the Association for the election of officers and for the transaction of business, is held on the fourth Monday in November. Two meetings each year, for the presentation and discussion of technical papers, are held in the Auditorium of the Engineers Club of St. Louis and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

(Abstract of Minutes of Meeting)

February 25th, 1918.—The 67th meeting was called to order at 6.30 P. M., at the American Hotel Annex; President Ockerson in the chair; C. M. Daily, Secretary; and present, also, 22 members.

The minutes of the 65th and 66th meetings were read and approved.

The Secretary read a letter from A. N. Talbot, President, Am. Soc. C. E., thanking the Association for its hospitality to him as its guest on January 23d, 1918.

The proposed change in the Constitution of the Society was discussed, and President Ockerson urged all members to vote.

Mr. Clinton H. Fisk addressed the meeting on the programme of the Quartermaster's Department in Utilizing the Civilian Engineer.

Mr. A. P. Greensfelder read a report of the Building Industries Committee of St. Louis on the Building Industry and the War.

On motion, duly seconded, the Association endorsed the Report of the Building Industries Committee of St. Louis, as submitted to the St. Louis Chamber of Commerce on February 25, 1918.

Adjourned.

San Diego Association, Organized 1915.

N. B. Kellogg, President; J. R. Comly, Secretary-Treasurer, 4105 Falcon Street, San Diego, Cal.

Seattle Association, Organized 1913.

A. S. Downey, President; Phil. A. Franklin, Secretary, Care, City Engineer's Office, County-City Building, Seattle, Wash.

The regular monthly meetings and luncheons of the Association are held at the Frye Hotel, 3d Avenue and Yesler Way, at 12.15 P. M., on the last Monday of each month. All members, in any grade, of the American Society of Civil Engineers are cordially invited to attend the meetings when in the vicinity.

Southern California Association, Organized 1914.

H. Hawgood, President; H. W. Dennis, Secretary, 329 San Fernando Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings with banquet, at Hotel Clark, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

Spokane Association, Organized 1914.

J. C. Ralston, President; B. J. Garnett, Secretary, City Hall, Spokane, Wash.

The regular meetings of the Association are held on the second Friday of each month, except July and August. The hour and place

of meeting are not fixed, but this information will be furnished on application to the Secretary.

Visiting members are invited to attend the meetings and luncheons.

Texas Association, Organized 1913.

J. M. Howe, President; J. F. Witt, Secretary, Dallas, Tex.

Utah Association, Organized 1916.

George L. Swendsen, President; H. S. Kleinschmidt, Secretary-Treasurer, 306 Dooly Building, Salt Lake City, Utah.

The Annual Meeting of the Association is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

**PRIVILEGES OF ENGINEERING SOCIETIES
EXTENDED TO MEMBERS OF THE
AMERICAN SOCIETY OF CIVIL ENGINEERS**

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Electrical Engineers, 25 West Thirty-ninth Street, New York City.

American Institute of Mining Engineers, 25 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 25 West Thirty-ninth Street, New York City.

Associação dos Engenheiros Cívis Portuguezes, Lisbon, Portugal.
Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 176 Mansfield Street, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, Public Library, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniorforening, Amaliegade 38, Copenhagen, Denmark.

Detroit Engineering Society, Detroit Board of Commerce Building, Detroit, Mich.

Engineering Association of Nashville, Commercial Club Building, Nashville, Tenn.

Engineering Association of New South Wales, 5 Elizabeth Street, Sydney, New South Wales, Australia.

- Engineering Societies Club of Hawaii**, E. F. Cykler, Secretary, Honolulu, Hawaii.
- Engineers and Architects Club of Louisville**, 1412 Starks Building, Louisville, Ky.
- Engineers' Club of Baltimore**, 6 West Eager Street, Baltimore, Md.
- Engineers' Club of Kansas City**, Robert S. Beard, Secretary, Third Floor, City Hall, Kansas City, Mo.
- Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.
- Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.
- Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.
- Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.
- Engineers' Club of Trenton**, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.
- Engineers' Society of Northeastern Pennsylvania**, 415 Washington Avenue, Scranton, Pa.
- Engineers' Society of Pennsylvania**, 31 South Front Street, Harrisburg, Pa.
- Engineers' Society of Western Pennsylvania**, 568 Union Arcade Building, Pittsburgh, Pa.
- Florida Engineering Society**, J. R. Benton, Secretary, Gainesville, Fla.
- Institute of Marine Engineers**, The Minorities, Tower Hill, London, E., England.
- Institution of Civil Engineers**, Great George Street, Westminster, S. W., London, England.
- Institution of Engineers of the River Plate**, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.
- Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.
- Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.
- Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.
- Louisiana Engineering Society**, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.
- Memphis Engineers' Club**, Memphis, Tenn.
- Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.
- Montana Society of Engineers**, Butte, Mont.
- North of England Institute of Mining and Mechanical Engineers**, Newcastle-upon-Tyne, England.
- Oregon Society of Civil Engineers**, Portland, Ore.
- Pacific Northwest Society of Engineers**, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Southwestern Society of Engineers, C. E. Banglebaugh, Secretary, 703 First National Bank Building, El Paso, Tex.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18-1, Copenhagen, Denmark.

Vermont Society of Engineers, George A. Reed, Secretary, Montpelier, Vt.

Western Society of Engineers, 1735 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE UNITED ENGINEERING SOCIETY LIBRARY

(From February 1st to March 1st, 1918)

DONATIONS*

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

CENTRAL STATIONS.

By Terrell Croft. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 10 + 332 pp., 306 illus., 8 x 6 in., cloth. \$2.50.

A description of current practice in the generation, transmission, and distribution of electrical energy, in a form adapted to readers of modest mathematical attainments. Contents: Distribution-System Nomenclature; Distribution Loss and Distribution Loss Factors; Maximum Demand and Demand Factors; Diversity and Diversity Factors; Load Factor, Plant Factor, and Connected-Load Factor; Load Graphs and Their Significance; General Principles of Current Design; Calculation and Design of Direct-Current Circuits; Calculation and Design of Alternating-Current Circuits; Transmission and Distribution of Electrical Energy; Lighting Protection Apparatus; Automatic Voltage Regulators; Switchboards and Switchgear; Characteristics of Electric Generating Stations; Adaptability of Steam Internal Combustion Engine and Hydraulic Prime Movers; Steam Electrical-Energy-Generating Stations; Internal Combustion Engine Stations; Hydro-Electric Stations.

CONTINUOUS-CURRENT MOTORS AND CONTROL APPARATUS:

A Practical Book for all Classes of Technical Readers. By W. Perren Maycock. N. Y. and Lond., Whittaker & Co., 1917. 16 + 331 pp., 150 illus., 8 x 5 in., cloth. \$2.25. (Gift of The Macmillan Co.)

Discusses the kinds of apparatus and motors in use, their connections, actions, testing and applications. Does not treat of design nor manufacture. Intended for those interested in installing and operating continuous-current motors.

POWER WIRING DIAGRAMS:

A Handbook of Connection Diagrams of Control and Protective Systems for Industrial Plants. By A. T. Dover. N. Y. and Lond., Whittaker & Co., 1917. 15 + 208 pp., 254 illus., 7 x 4 in., cloth. \$2.25. (Gift of The Macmillan Co.)

A pocket-book of detail diagrams, drawn to represent the actual control apparatus to which they refer, instead of being merely ideal. The apparatus described is that used in Great Britain.

THE ALDRICH MARINE DIRECTORY:

Containing (A) List of Concerns Which Build and Repair Vessels; (B) List of Steamship, Steamboat, and Other Vessel Owners Using the American Flag. N. Y., Aldrich Publishing Co., 1918. 220 pp., 8 x 4 in., flexible cloth. \$5.00.

These lists are arranged geographically. The location, officers, kind, and maximum size of vessels built are given for each shipyard. The list of owners gives the location, officers, and the names, tonnage, and service of the vessels.

* Unless otherwise specified, books in this list have been donated by the publishers.

KINEMATICS OF MACHINERY:

A Text-Book on Mechanisms and Their Properties with Many Practical Applications for Engineers and for Students in Technical Schools. By Arthur Warner Klein. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 15 + 227 pp., 118 illus., 7 diagrams, 9 x 6 in., cloth. \$2.50.

This treatise occupies itself with the equivalence displacement, velocities, and accelerations of mechanisms and gives the necessary preliminaries in the way of auxiliary constructions and theorems with applications to many practical problems. These are solved by relatively simple graphical methods.

FINDING AND STOPPING WASTE IN MODERN BOILER ROOMS:

Vol. 2, A Reference Manual to Aid the Owner, Manager, and Boiler-Room Operator in Securing and Maintaining Plant Economy. Phila., Harrison Safety Boiler Works, 1918. 274 pp., 120 illus., 7 x 5 in., linen. \$1.00.

This work is a handbook of practical information, compiled from the best authorities available, and is a convenient reference manual on boiler-room practice. Contents: Fuels; Combustion; Heat Absorption; Boiler Efficiency and Boiler Testing; Boiler Plant Proportioning and Management; Cochrane Meters.

MEASUREMENT OF GAS BY ORIFICE METER.

By Henry P. Westcott. Erie, Metric Metal Works, 1918. 408 pp., 35 illus., tab., 8 x 5 in., cloth. \$3.50.

Although there have been many circulars and papers written on the subject of the orifice meter and orifice measurement, no attempt has been made to collect and preserve these data in book form, and it is the author's intention to fill this need, and, in addition, to add a full set of pressure extensions so necessary in figuring gauge charts.

AUTOMOBILE STARTING, LIGHTING, AND IGNITION:

A Complete Exposition Explaining all Forms of Electrical Ignition Systems Used with Internal Combustion Engines of all Types, also Including a Comprehensive Series of Instructions Pertaining to Starting and Lighting Systems of Automobiles. By Victor W. Pagé. 4th ed., rev. N. Y., The Norman W. Henley Publishing Co., 1918. 519 pp., 298 illus., 8 x 5 in., flexible cloth. \$1.50.

Intended for owners, operators, and mechanics. The descriptions are non-mathematical but detailed. A chapter is devoted to the miscellaneous electrical devices used on automobiles.

MODEL AEROPLANES AND THEIR ENGINES:

A Practical Book for Beginners. By George A. Cavanagh. Drawings by Harry G. Schultz, with an Introduction by Henry Woodhouse. N. Y., Moffat Yard & Company, 1917. 152 pp., 20 illus., 19 pl., 8 x 5 in., cloth. \$1.00.

This work includes both models launched by hand and those driven by compressed air, gasoline, or steam. Detailed directions for the construction of several types are given.

AVIATION ENGINES:

Design, Construction, Operation and Repair; A Complete, Practical Treatise Outlining Clearly the Elements of Internal Combustion Engineering with Special Reference to the Design, Construction, Operation, and Repair of Airplane Power Plants; also the Auxiliary Engine Sys-

terms, such as Lubrication, Carburetion, Ignition, and Cooling. It Includes Complete Instructions for Engine Repairing and Systematic Location of Troubles, Tool Equipment, and Use of Tools, also Outlines the Latest Mechanical Processes. By Victor W. Pagé. N. Y., The Norman W. Henley Publishing Co., 1918. 589 pp., 253 illus., 9 x 6 in., cloth. \$3.00.

A text-book intended for instruction purposes, especially for students preparing for service as aviators or aviation mechanics in the Aviation Section of the Signal Corps. The author is Assistant Engineering Officer in the Signal Corps Aviation School.

TESTING FOR THE FLOTATION PROCESS.

By A. W. Fahrenwald. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 173 pp., 34 illus., 7 x 4 in., leather. \$1.50.

Written to present the various theories of flotation and to furnish the information necessary to conduct intelligent tests for the flotation process. Contents: Concentration by Flotation; Classification of the Flotation Process; The Theory of Flotation; The Flotation of Oxidized Ores; Oil and Other Reagents in Flotation; Tests; Cost of Flotation; Formulas and Tables.

NOTES ON MILITARY EXPLOSIVES.

By Erasmus Weaver. 4th ed., rev. and enl. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 382 pp., 9 x 6 in., cloth. \$3.25.

The present edition of this book has been thoroughly revised and brought up to date by including the changes in the manufacture, use, storage, and transportation of military explosives which have been developed between 1912 and 1916. Contents: Principles of Chemistry; Substances Used in the Manufacture of Explosives; General Remarks on Explosives; Progressive Explosives; Detonating Explosives; Exploders; Service Tests of Explosives; Storage of Explosives; Handling High Explosives; Demolitions.

A SHORT HISTORY OF SCIENCE.

By W. T. Sedgwick and H. W. Tyler. N. Y., The Macmillan Company, 1917. 15 + 474 pp., 9 x 6 in., cloth. \$2.50.

The present work aims to furnish the student and the general reader with a concise account of the origin of that scientific knowledge and that scientific method which have come to have so important a share in shaping the conditions and directing the activities of human life. It is based on a lecture course given by the authors to undergraduate classes in the Massachusetts Institute of Technology for the purpose of furnishing a broad general perspective of the evolution of science, and of the relations of the sciences to each other and to the general progress of civilization.

OPTIC PROJECTION:

Principles, Installation, and Use of the Magic Lantern, Projection Microscope, Reflecting Lantern, Moving Picture Machine. By Simon Henry Gage and Henry Phelps Gage. Ithaca, Comstock Publishing Co., 1914. 731 pp., 413 illus., 9 x 6 in., cloth. \$3.00.

The aims of the authors have been to explain the underlying principles of optic projection and to give such simple, explicit directions that any intelligent person can succeed in all the fields of the art. Contains appendices giving a brief historical summary, list of manufactures, and a bibliography.

DESCRIPTIVE GEOMETRY.

By Ervin Kenison and Harry Cyrus Bradley. N. Y., The Macmillan Company, 1917. 10 + 287 pp., 332 illus., 8 x 5 in., cloth. \$2.00.

A college text-book, representing the instruction given at the Massachusetts Institute of Technology. The point of view is that of the draftsman, and the text is designed to train him to see clearly the conditions of a drawing in space.

THE PRINCIPLES OF ECONOMIC GEOLOGY.

By William Harvey Emmons. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1918. 18 + 606 pp., 210 illus., 9 x 6 in., cloth. \$4.00.

An attempt to present as briefly as practicable to advanced students of geology, a perspective of the science of metalliferous and non-metalliferous deposits, excluding mineral fuels. Numerous bibliographies on special topics are included.

STATISTICS.

By William B. Bailey and John Cummings. Chic., A. C. McClurg & Co., 1917. 153 pp., 7 x 4 in., cloth. 60 cents.

An elementary work for those who need an acquaintance with the fundamentals of the subject. Mathematical formulas have been avoided when possible. A bibliography of works in English is included. Contents: Importance of Statistics; The Field of Study; Gathering the Raw Material; Editing Schedules; Tabulation; Ratios; Averages; Graphic Representation; Correlation; Bibliography.

ENZYMES AND THEIR APPLICATIONS.

By Jean Effront. English Translation by Samuel C. Prescott. N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd. (copyright 1902). 11 + 332 pp., 9 x 6 in., cloth. \$3.00.

Treats of the enzymes of carbohydrates and the oxidases. Gives particular attention to the theoretical questions involved in their action, but also discusses their industrial applications. Bibliographies are appended to each chapter.

DRYING CLAY WARES.

By Ellis Lovejoy. Indianapolis, T. A. Randall & Co. (copyright 1916). 166 pp., 86 illus., 9 x 6 in., cloth. \$2.00.

As the existing treatises on heating, ventilation, and drying do not contain adequate data applicable to the drying of clay wares, the author has selected the existing information of use in this work, and has modified it to suit the conditions met. These treatises appeared first as a series of articles in the *Clay-Worker*.

FRENCH FORESTS AND FORESTRY:

Tunisia, Algeria, Corsica; with a Translation of the Algerian Code of 1903. By Theodore S. Woolsey, Jr. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 15 + 238 pp., 20 illus., 9 x 6 in., cloth. \$2.50.

This work embodies the results of a study of the more important phases of forest practice in the French Colonies mentioned, with the aim of presenting the essentials of methods which may be applied directly in the United States. Generalizations and comparisons between French and American methods have been largely omitted; the idea has been, instead, to describe the methods used and the results obtained in countries where many of the conditions approximate those met by American foresters.

ELEMENTS OF PLUMBING.

By Samuel Edward Dibble. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1918. 170 pp., 83 illus., 7 x 5 in., cloth. \$1.50.

This is a text-book for beginners, which describes in minute detail the various methods used by plumbers, the tools, and the standard forms of fixtures. Water supply to buildings, the removal of waste waters, and gas fitting are considered, and plumbing codes are given.

DISTRICT HEATING:

A Brief Exposition of the Development of District Heating and Its Position among Public Utilities. By S. Morgan Bushnell and Fred. B. Orr. N. Y., Heating and Ventilating Magazine Co., 1915. 290 pp., 82 illus., 1 por., 9 x 6 in., cloth. \$3.00.

It has been the endeavor of the authors to take up, in a brief manner, the development of the art of District Heating, as far as possible, from a non-technical standpoint, in order that those who have not had experience with this subject might obtain a general knowledge of it and its relation to other public utilities. As a rule the discussion of the more involved technical points has been avoided, the reader being referred to standard text-books and other engineering literature which take up these subjects in detail. The object of the book is not only to impart a general knowledge of District Heating to those who wish to study the subject, but also to promote the interests of District Heating companies. For this purpose various points on economical operation are suggested, as illustrated in the methods practiced by companies which have made a success in this line of work. Comparative data are presented indicating the prices that can reasonably be charged for heating service. Contents: Origin and Development of District Heating; Selling of Heat; Heat Distribution Systems; Metering; District-Heating Stations; Methods of Estimating Heating Requirements in Buildings; Estimating Miscellaneous Steam Requirements in Buildings; Relation Between Heat Load and Electric Load in Buildings; The Use of Heating Data in Making Estimates on the Comparative Costs of Isolated Plant and Central-Station Service; Relation Between Central-Station Heating and Central-Station Lighting and Power.

METER RATES FOR WATER WORKS.

By Allen Hazen. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1918. 217 pp., 21 illus., 9 x 6 in., cloth. \$2.25.

This book deals with the problem of distributing the burden of supporting a water-works system among those who use the water, in a just and equitable manner. It also deals with the technic of handling statistics that must be used, of making the required computations, and of estimating the revenue that will be produced by a given set of rates. The volume is based on the author's service as Chairman of the Committee on Water Rates of the New England Water Works Association and his experience in establishing water rates in various water-works systems.

ROLL OF HONOR

A List of Members of the Society Who are Serving in the Army or Navy of the United States or Any of Its Allies.*

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- Abbot, Frederick William.** Lt.-Col., British Army; Metropolitan Club, New York City.
- Acher, A. H.** Maj., Corps of Engrs., U. S. A., 4th Engrs., Camp Greene, N. C.
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- Ackerman, Arthur P.** 1st Lieut., Engr. R. C., 33d Engrs.; Great Barrington, Mass.
- Adams, Edward M.** Maj., U. S. A., Care, The Adj.-Gen., U. S. A., Washington, D. C.
- Adams, Milton Jewell.** Capt., Co. C, 114th Engrs., Camp Beauregard, Alexandria, La.
- Adams, Raymond E.** Capt., Q. M. R. C.; Asst. to the Q. M., S. E. D., Peoples Bldg., Charleston, S. C.
- Albert, Frederick W.** Maj., Engr. R. C., 33d Engrs.; 23 Isham St., Burlington, Vt.
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- Alexander, E. Porter.** 1st Lieut., Engr. R. C., 509th Engrs., Fort Sam Houston, San Antonio, Tex.
- Alexander, Kay.** Maj., 2d in Command, 12th Canadian Ry. Troops, B. E. F., France.
- Allen, Franklin R.** Capt., Engr. R. C., 8th Co., E. R. O. T. C., Camp Lee, Va.
- Allen, Herschel Heathcote.** Capt., Engr. R. C.; Instr., Camp Lee, Petersburg, Va.
- Allen, Ralph B.** 1st Lieut., Engr. R. C., Co. B, 25th Engrs., Am. Exp. Force, France.
- Allen, Walter Henry.** Maj., Engr. R. C.; 1112 East Jefferson St., Bloomington, Ill.
- Allen, Walter Hinds.** Civ. Engr., U. S. N. (rank of Lt.-Commander); Public Works Officer, Naval Training Station, Great Lakes, Ill.
- Allison, William F.** Maj., Engr. R. C., Am. Exp. Force, France.
- Altman, Frank S.** Lieut., Engr. R. C., 23d Engrs.; Atchison, Kans.
- Altstaetter, F. W.** Col., Corps of Engrs., U. S. A., U. S. Engr. Office, Grand Rapids, Mich.
- Anderson, J. E.** Maj., 212th Field Co., Royal Engrs., B. E. F., France.

* This list is made up from replies to a circular forwarded to members of the Society, and others, and is probably neither accurate nor complete. It is requested that the attention of the Secretary be called to any omissions or inaccuracies in order that they may be corrected in subsequent lists.

- Anderson, J. H.** Capt., Engr. R. C., Replacement Troops, Washington Barracks, Washington, D. C.
- Anderson, W. P.** Capt., Engr. R. C., Am. Exp. Force, France.
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- Angas, Robert M.** 1st Lieut., U. S. N. G., 106th Engrs., Camp Wheeler, Macon, Ga.
- Annear, E. H.** Capt., Engrs. U. S. R., 20th Engrs., Camp American University, Washington, D. C.
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- Armstrong, Merwin.** Capt., Engr. R. C., 105th Engrs., 30th Div., Camp Sevier, Greenville, S. C.
- Arn, William G.** Capt., Engr. R. C., 1st Bn., 13th U. S. Engrs. (Ry.), Am. Exp. Force, France.
- Ashkins, Nathan Thomas.** 1st Lieut., Engr. R. C., Lines of Communication, Eng. Headquarters, Am. Exp. Force, France.
- Ashley, Carl.** Capt., Engr. R. C., U. S. Military P. O. 702, Am. Exp. Force, France.
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- Baffrey, Charles R.** Capt., 102d Reg. d'Artillerie (French Army), Secteur Postal 160, B. C. M., Paris, France.

- Bailey, Lewis P.** Capt., Engr. R. C., Co. A, 304th Engrs., Camp Meade, Baltimore, Md.
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- Barber, Charles W.** Private, 38th Engrs.; 3428 Brown St., N. W., Washington, D. C.
- Barber, Justin F.** Private, 23d Engrs., Camp Meade, Md.
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- Bartholomew, B. W.** Lieut., Engr. R. C., 301st Engrs., Camp Devens, Ayer, Mass.
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- Belknap, Francis W.** Engr. R. C., U. S. Army P. O. 705, Am. Exp. Force, France.

- Bell, George Edward.** Lieut., Canadian Engrs., Care, Bank of Montreal, Waterloo Pl., London, S. W., England.
- Bellinger, L. F.** Civ. Engr., U. S. N. (rank of Commander), U. S. Navy Yard, Bremerton, Wash.
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- Benham, Claude Gilbert.** Capt., C. A. C., U. S. A.; 800 Park Ave., Norfolk, Va.
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- Benson, Orville.** Maj., Engr. R. C., Headquarters, Am. Exp. Force, France.
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- Betts, Clifford A.** 1st Lieut., C. A. R. C., Am. Exp. Force, France.
- Biddle, John.** Maj.-Gen., Corps of Engrs., U. S. A.; Asst. Chf. of Staff, U. S. A., War Dept., Washington, D. C.
- Billings, A. W. K.** Lt.-Commander, Care, Commander, U. S. Naval Aviation Forces, Paris, France.
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- Bixby, William H.** Brig.-Gen., U. S. A. (*Retired*), 428 Customhouse, St. Louis, Mo.
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- Blackman, J. W. B.** Lieut., Canadian Ry. Troops, Canadian Expeditionary Force.
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- Blair, McCrea Parker.** Capt., No. 1 Depot Bn., Manitoba Reg., Winnipeg, Man., Canada.
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- Boggs, F. C.** Col., 315th Engrs., N. A., Camp Travis, San Antonio, Tex.
- Boland, Charles J.** 1st Lieut., Sig. C., U. S. A., 80th Aero Squadron, Am. Exp. Force, France.
- Bolin, Harry W.** Sergeant, Co. E, 23d Engrs., Camp Meade, Annapolis Junction, Md.
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- Boorman, Kitchell M.** Lieut., Sig. C., U. S. A., 481st Aero Squadron, Aviation Branch, Morrison, Va.
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- Boyden, Harry C.** Capt., Engr. R. C.; Asst. to Dept. Engr., Headquarters, Western Dept., San Francisco, Cal.
- Bragg, Kendal B.** Asst. Civ. Engr. (rank of Lieut. (Junior Grade)), Navy Aeronautic Station, Pensacola, Fla.
- Braly, Raymond F.** 1st Lieut., Engr. R. C.; Officer in Chg., Engr. Supply Depot, Camp Shelby, Hattiesburg, Miss.
- Braunworth, Percy L.** Capt., Engr. R. C., Care, Director General of Transportation, Army P. O. 705, Am Exp. Force, France.
- Brewster, Henry B.** Capt. and Adj., 303d Engrs., Camp Dix, Wrightstown, N. J.
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- Bright, Graham B.** Capt. and Regimental Adj., 305th Engrs. (Pioneers), Camp Lee, Petersburg, Va.
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- Wilson, Robert B. M.** Capt., Engr. R. C., 311th Engrs., Camp Grant, Rockford, Ill.
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(From February 8th to March 7th, 1918)

ADDITIONS

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BLACK, DUDLEY FRANK. Capt., Engrs., U. S. } R., Camp Travis, Tex.; 1338 Milton Ave., } Hollywood, Cal.	Assoc. M. M.	April 2, 1912 Jan. 14, 1918
EDMONDSTONE, GEORGE STOVALL. Asst. Engr. in Chg. of Constr., Comm. of Public Docks, 1289 Rodney Ave., Portland, Ore.		Nov. 27, 1917
SHANNON, WILLIAM DAY. Gen. Supt., Stone & Webster, P. O. Box 297, Youngstown, } Ohio.	Assoc. M. M.	Dec. 5, 1911 Jan. 14, 1918
WADDELL, NEEDHAM EVERETT. Cons. Engr. } (Waddell & Son), 800 Graphic Arts } Bldg., Kansas City, Mo.	Jun. Assoc. M. M.	Sept. 1, 1908 May 7, 1913 Jan. 14, 1918

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BENNETT, FRED. P. O. Box 487, Little Rock, Ark.		Oct. 9, 1917
BUTLER, ARTHUR GRAY. Supt., Alfred Struck } Co., 11 Eastover Court, Louisville, Ky. } CARTER, CLARENCE REED. Div. Mgr., Texas Gas } & Elec. Co., Center, Tex.	Jun. Assoc. M. Jun. Assoc. M.	June 23, 1916 Oct. 9, 1917 Feb. 4, 1914 Jan. 14, 1918
GELLERT, NATHAN HENRY. 308 Widener Bldg., Philadel- phia, Pa.		Oct. 9, 1917
HIRZEL, ALFRED SPARKS. Capt., 1st Delaware } Inf., Camp Dix, N. J. (Res., 1300 Shall- } cross Ave., Wilmington, Del.)	Jun. Assoc. M.	Sept. 3, 1913 Nov. 27, 1917
JERRARD, LEIGH PATTERSON. 2d Lieut., Head- quarters, 67th Artillery Brigade, Am. } Exp. Forces, France (Res., 215 South } Broom St., Madison, Wis.)	Jun. Assoc. M.	Oct. 5, 1909 Oct. 9, 1917
JOHNSON, JOHN MONROE. Maj., 1st Bn., 117th Engrs., Headquarters, Am. Exp. Forces, France.		Nov. 27, 1917
JOHNSTONE, LESLIE INGALLS. Asst. Prof. of Civ. Eng., Univ. of Manitoba, 177 Oak St., Winnipeg, Man., Canada.		Jan. 14, 1918
LANDSALE, JOHN. Capt., Engrs., U. S. R. Military Post Office No. 701, Am. Exp. Forces, France.		Sept. 11, 1917
LARSEN, PETER MAGNUS. Station F, Kansas City, Mo.		Jan. 14, 1918
LAWRENCE, FRANK ELMAKER. Lieut., 17th Engrs. (Ry.), Am. Exp. Forces, France; Care, C. K. Lawrence, 415 West 36th St., Savannah, Ga.		Nov. 27, 1917

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MALLOY, JOHN MICHAEL. Lieut., 342d F. A., Camp Funston, Kans.; 1704 Marquette St., Davenport, Iowa.....		Nov. 27, 1917
MARSTON, FRANK ALWYN. Designing Engr., Metcalf & Eddy, 20 Phillips St., Wollas- ton, Mass.....	} Jun. Mar. 1, 1910 Assoc. M. Sept. 11, 1917	
MAY, DONALD CURTIS. Office Engr., Gardner S. Williams, Cornwell Bldg., Ann Arbor, Mich.	} Jun. May 6, 1914 Assoc. M. Jan. 14, 1918	
O'NEILL, OWEN HUGH. County Surv., Santa Barbara County, 2410 Fletcher Ave., Santa Barbara, Cal.....		Nov. 27, 1917
PLANK, DAVID HARLAN. 1st Lieut., Engrs. U. S. R., Co. B, 310th Engrs., Camp Custer, Battle Creek, Mich.....		Sept. 11, 1917
SMITH, ALEXANDER CRAWFORD, JR. 1st Lieut., Engrs., U. S. R.; 1009 North Calvert St., Baltimore, Md.....	} Jun. April 30, 1912 Assoc. M. Jan. 14, 1918	
SMITH, EARL AUDIE. 1st Lieut., Engrs. U. S. R., Fort Leavenworth, Kans.....	} Jun. June 24, 1914 Assoc. M. Sept. 11, 1917	
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WYCKOFF, MAURICE MAYER. The New Packer House, Perth Amboy, N. J.....		Jan. 14, 1918
YEO, WILLIAM ALBERT. Engr. in Chg., Nica- ragua Development Corporation, Pearl Lagoon, Nicaragua.....	} Jun. Oct. 1, 1907 Assoc. M. Nov. 27, 1917	

ASSOCIATES

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JUNIORS (*Continued*)

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RESIGNATIONS

JUNIORS

Date of
Resignation

DANA, FOREST CHARLES Dec. 31, 1917

DEATHS

GAY, CHARLES WEBSTER. Elected Member, May 6th, 1891; died February 1st, 1918.

SONNE, OTTO. Elected Member, September 7th, 1887; died November 13th, 1917.

VORCE, CLARENCE BROWNING. Elected Junior, April 30th, 1895; Associate Member, October 7th, 1896; Member, May 2d, 1890; died February 4th, 1918.

WATERHOUSE, JOHN. Elected Member, October 4th, 1899; died February 20th, 1918.

WRIGHT, AUGUSTINE WASHINGTON. Elected Member, May 5th, 1886; died February 3d, 1918.

Total Membership of the Society, March 7th, 1918,
8 629.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(January 1st to February 28th, 1918)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- | | |
|---|--|
| (2) <i>Proceedings, Engrs. Club of Phila., Philadelphia, Pa.</i> | (31) <i>Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.</i> |
| (3) <i>Journal, Franklin Inst., Philadelphia, Pa., 50c.</i> | (32) <i>Mémoires et Compte Rendu des Travaux, Soc. Ing. Clv. de France, Paris, France.</i> |
| (4) <i>Journal, Western Soc. of Engrs., Chicago, Ill., 50c.</i> | (33) <i>Le Génie Civil, Paris, France, 1 fr.</i> |
| (5) <i>Transactions, Can. Soc. C. E., Montreal, Que., Canada.</i> | (34) <i>Portefeuille Economiques des Machines, Paris, France.</i> |
| (6) <i>Journal, Am. Inst. of Archts., Washington, D. C., 50c.</i> | (35) <i>Nouvelles Annales de la Construction, Paris, France.</i> |
| (7) <i>Gesundheits Ingenieur, München, Germany.</i> | (36) <i>Cornell Civil Engineer, Ithaca, N. Y.</i> |
| (8) <i>Stevens Indicator, Hoboken, N. J., 50c.</i> | (37) <i>Revue de Mécanique, Paris, France.</i> |
| (9) <i>Industrial Management, New York City, 25c.</i> | (38) <i>Revue Générale des Chemins de Fer et des Tramways, Paris, France.</i> |
| (11) <i>Engineering (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.</i> | (39) <i>Technisches Gemeindeblatt, Berlin, Germany, 0, 70m.</i> |
| (12) <i>The Engineer (London), International News Co., New York City, 35c.</i> | (40) <i>Zentralblatt der Bauverwaltung, Berlin, Germany, 60 pf.</i> |
| (13) <i>Engineering News-Record, New York City, 15c.</i> | (41) <i>Electrotechnische Zeitschrift, Berlin, Germany.</i> |
| (15) <i>Railway Age, New York City, 15c.</i> | (42) <i>Proceedings, Am. Inst. Elec. Engrs., New York City, \$1.</i> |
| (16) <i>Engineering and Mining Journal, New York City, 15c.</i> | (43) <i>Annales des Ponts et Chaussées, Paris, France.</i> |
| (17) <i>Electric Railway Journal, New York City, 10c.</i> | (44) <i>Journal, Military Service Institution, Governors Island, New York Harbor, 50c.</i> |
| (18) <i>Railway Review, Chicago, Ill., 15c.</i> | (45) <i>Coal Age, New York City, 10c.</i> |
| (19) <i>Scientific American Supplement, New York City, 10c.</i> | (46) <i>Scientific American, New York City, 15c.</i> |
| (20) <i>Iron Age, New York City, 20c.</i> | (47) <i>Mechanical Engineer, Manchester, England, 3d.</i> |
| (21) <i>Railway Engineer, London, England, 1s. 2d.</i> | (48) <i>Zeitschrift, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.</i> |
| (22) <i>Iron and Coal Trades Review, London, England, 6d.</i> | (49) <i>Zeitschrift für Bauwesen, Berlin, Germany.</i> |
| (23) <i>Railway Gazette, London, England, 6d.</i> | (50) <i>Stahl und Eisen, Düsseldorf, Germany.</i> |
| (24) <i>American Gas Engineering Journal, New York City, 10c.</i> | (51) <i>Deutsche Bauzeitung, Berlin, Germany.</i> |
| (25) <i>Railway Mechanical Engineer, New York City, 20c.</i> | (52) <i>Rigasche Industrie-Zeitung, Riga, Russia, 25 kop.</i> |
| (26) <i>Electrical Review, London, England, 4d.</i> | (53) <i>Zeitschrift, Oesterreichischer Ingenieur und Architekten Vereines, Vienna, Austria, 70h.</i> |
| (27) <i>Electrical World, New York City, 10c.</i> | (54) <i>Transactions, Am. Soc. C. E., New York City, \$12.</i> |
| (28) <i>Journal, New England Water-Works Assoc., Boston, Mass., \$1.</i> | (55) <i>Transactions, Am. Soc. M. E., New York City, \$10.</i> |
| (29) <i>Journal, Royal Society of Arts, London, England, 6d.</i> | |
| (30) <i>Annales des Travaux Publics de Belgique, Brussels, Belgium, 4 fr.</i> | |

- (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$6.
 (57) *Colliery Guardian*, London, England, 5d.
 (58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
 (59) *Proceedings*, Am. Water-Works Assoc., Troy, N. Y.
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
 (62) *American Drop Forger*, Thaw Bldg., Pittsburgh, Pa., 10c.
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.
 (64) *Power*, New York City, 5c.
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
 (66) *Gas Journal*, London, England, 6d.
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.
 (69) *Der Eisenbau*, Leipzig, Germany.
 (71) *Journal*, Iron and Steel Inst., London, England.
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
 (72) *American Machinist*, New York City, 15c.
 (73) *Electrician*, London, England, 18c.
 (74) *Transactions*, Inst. of Min. and Metal., London, England.
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.
 (76) *Brick*, Chicago, Ill., 20c.
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
 (79) *Forscherarbeiten*, Vienna, Austria.
 (80) *Industrie Zeitung*, Berlin, Germany.
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
 (83) *Gas Age*, New York City, 15c.
 (84) *Le Ciment*, Paris, France.
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
 (86) *Engineering and Contracting*, Chicago, Ill., 10c.
 (87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.
 (90) *Transactions*, Inst. of Naval Archts., London, England.
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
 (95) *International Marine Engineering*, New York City, 20c.
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
 (101) *Metal Worker*, New York City, 10c.
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
 (103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.
 (106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
 (108) *Southern Machinery*, Atlanta, Ga., 10c.
 (109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
 (110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
 (111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.
 (112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.
 (113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.
 (114) *Journal*, Institution of Municipal and County Engrs., London, England, 1s. 6d.
 (115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.
 (116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

LIST OF ARTICLES

Bridges.

- Mt. Pleasant Road Bridge, Toronto.* J. S. Burgoyne. (96) Jan. 10.
 Problems and General Methods of Erecting the Scotoville Bridge.* Clyde B. Pyle. (13) Jan. 10.
 Turning Back Abutment Wing Walls Saves Material.* Charles K. Mohler. (13) Jan. 24.
 The Scotoville Bridge.* Frank W. Skinner. (11) Jan. 25.
 Expansion Joints and Traction Trusses, Quebec Bridge.* Archibald John Meyers. (96) Feb. 7.
 New Pennsylvania Railroad Bridge at Manayunk, Pa.* Albert M. Wolf. (18) Feb. 9.
 Bridge Work in Guatemala Torrent Used Armored Tower. (13) Feb. 14.

* Illustrated.

Bridges—(Continued).

- Illinois Central Bascule Bridge is Hand Operated.* (13) Feb. 14.
 Shifting a 4 000-Ton Bridge on Freight Car Trucks.* (15) Feb. 15.
 Concrete-Arch Railway Bridge Costs Less Than Steel.* (13) Feb. 21.
 Le Pont Basculant Système Scherzer de Keadby (Angleterre).* P. Calfas. (33) Jan. 19.
 Die Fertigstellung der St. Lawrence-Brücke bei Quebec.* A. Rohn. (107) Jan. 26.

Electrical.

- The Problem of Artificial Lighting.* C. E. Clewell. (9) Jan.
 The Technical Story of the Frequencies. B. G. Lamme. (42) Jan.
 Electric Clock at Agnews Hospital.* L. A. Gain. (111) Jan. 1.
 Application of Large Hydro-Electric Units. Arnold Pfau. (111) Jan. 1.
 Electrical Inspection. E. F. Dunlap. (Abstract of a paper read before the Convention of Oregon Contractors and Dealers.) (111) Jan. 1.
 National Electric Code—Marine Work. (111) Jan. 1.
 Condensers for Power Circuits.* (73) Jan. 4.
 Electric Power Supply at Buenos Aires.* (11) Jan. 4.
 Joint Boxes and Terminals for Split Conductor Cables.* (26) Jan. 4.
 Adopting Existing Lines to Increased Loads.* E. B. Hook, Jr. (27) Jan. 5.
 Electrical Interconnection to Conserve Fuel.* (27) Jan. 5.
 Increasing Output Without Enlarging Equipment.* Joseph T. Foster. (27) Jan. 5.
 Shipbuilding Expedited by Electric Service.* David Elwell. (27) Jan. 5.
 Methods of Drying Out Flooded Power Plant Equipment.* Norman L. Rea. (64) Jan. 8.
 Operation and Maintenance of Elevators-Winding-Drum Machines.* R. H. Whitehead. (64) Jan. 8.
 The Care of Commutators of Direct-Current Machinery.* L. Fokes. (57) Jan. 11.
 Some Points of Interest to Northumberland and Durham Colliery Engineers. A. C. Nelson. (Abstract of paper read before the North of England Branch of the Assoc. of Min. Elec. Engrs.) (73) Jan. 11.
 Cyclic Fluctuations in Rate of Lamp Renewal. M. D. Cooper. (27) Jan. 12.
 Electric Railway Power at Montreal.* (17) Jan. 12.
 Design of Rotor Cores for Electrical Machines. William Knight. (27) Jan. 12.
 Determining Stray Power of a Transmission Line.* D. D. Ewing. (17) Jan. 12.
 Long Spans Permitted by Steel Wires a Saving.* L. M. Klauber. (27) Jan. 12.
 Calculations in Use of Projectors.* Waldo C. Cole. (111) Jan. 15.
 Problems of Factory Lighting.* Romaine W. Myers. (111) Jan. 15.
 A "Density-Cell" with Slight Local Action.* Ch. Fery. (Abstract of paper read before the Société Internationale des Electriciens.) (73) Jan. 18.
 Cable Fault Localization in Practice.* O. M. W. Hutchison. (26) Jan. 18.
 Iron Commutators. Frederick Murgatroyd. (26) Jan. 18.
 Turbo-Rotor Cap-Rings.* R. Roberts. (73) Serial beginning Jan. 18.
 A Solution for an Acceptance-Test Problem: Simple Method of Correcting Generator-Unit Load—Characteristic Curve for Variations in Speed—of Entire Accuracy When the Magnetic Circuit is Highly Saturated. W. B. Kouwenhoven. (27) Jan. 19.
 Obtaining Power Factor by Use of Wattmeter.* E. G. Barrington. (27) Jan. 19.
 Fires in Turbo-Generators. M. A. Walker. (64) Jan. 22.
 Differential Electro-Magneto Clutch.* (12) Jan. 25.
 New Night Lights for Pullman Cars.* (15) Jan. 25.
 The Potentialities of a National Power Scheme. Ernest P. Hollis. (Abstract of paper read before Warwickshire Branch of the Assoc. of Min. Elec. Engrs.) (22) Jan. 25.
 The Selection of an Electricity Meter. W. G. N. (26) Jan. 25.
 Electrical Properties of Vulcanized Fiber. William Eves, 3d. (27) Jan. 26.
 Successful Operation of Secondary Networks.* S. Bingham Hood. (27) Jan. 26.
 A New Standard of Current and Potential.* Chester T. Allcutt. (42) Feb.
 A Thermo-electric Standard Cell. C. A. Hoxie.* (42) Feb.
 Automatic Control of High Temperature. R. P. Brown. (Abstract of a paper read before the Faraday Soc. of London.) (62) Feb.
 Commutation in Alternating-Current Machinery.* Marius C. A. Latour. (42) Feb.
 Factory Lighting Codes and Rules; a Review of Progress, and the Regulations of Wisconsin, New York, Pennsylvania and New Jersey.* C. E. Clewell. (9) Feb.
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CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
BY
JOHN B. BOWEN
OF THE
CITY OF BOSTON
IN TWO VOLUMES
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 Women's Labor in British War Industries.* L. H. Quin. (20) Jan. 17.
 Professional Fees and Their Collection. Frederick F. Sharpless. (16) Jan. 26.
 A Fair Basis of Profit-Sharing. George Kingdon Parsons. (9) Feb.
 The Filter-Press.* D. R. Sperry. (105) Feb. 1.
 Some General Aspects of Evaporation and Drying. Hugh K. Moore. (Paper read before the Am. Inst. of Chemical Engrs.) (105) Feb. 1.
 Some Reforms in the Patent System. F. W. H. Clay. (19) Feb. 9.
 Restoration of Materials After Fires. (19) Feb. 16.
 L'Organisation de l'Effort Industriel. (33) Jan. 12.

Municipal.

- Building a Town to House Three Thousand Shipbuilders.* (13) Jan. 31.
 Developing the Community Interest.* (20) Feb. 7.
 Cost Plus Contract for Municipal Work. (86) Feb. 13.

Railroads.

- A Comparison of Two Forms of Snow Shed Construction.* (87) Jan.
 American Track Standards in France.* (87) Jan.
 Improved Apprenticeship Methods on the Pennsylvania.* (25) Jan.
 Increase Locomotive Operating Efficiency.* Clement F. Street. (25) Jan.
 Locomotive Maintenance Problems.* (25) Jan.
 Renewing the Stringers on Trestles.* (87) Jan.
 The Effect of Water Scooping on Train Resistances.* H. C. Webster. (21) Jan.

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Railroads—(Continued).

- The Improper Loading of Lumber.* (25) Jan.
 Telescope Sections for Latest Timber Snowsheds.* (13) Jan. 3.
 All-Wood and Composite Hopper Cars for the Norfolk & Western Railway.*
 B. W. Kadel. (18) Jan. 5.
 Mallet Compound Locomotives for Wheeling & Lake Erie Ry.* (18) Jan. 5.
 Train Handling. G. H. Wood. (18) Jan. 5.
 Union Pacific Adopts Unit-Member Concrete Snowsheds.* W. R. Armstrong. (13)
 Jan. 10.
 A Concrete Roadway System in a Shop Yard.* Charles E. Parks. (15) Jan. 11.
 A Railway's Part in Developing Western Canada.* (15) Jan. 11.
 The Transportation of Perishable Commodities.* M. E. Pennington. (Abstract
 of paper read before St. Louis Railway Club.) (15) Jan. 11.
 Constructing Logging Railroad with a Ditcher.* Albert M. Wolf. (18) Jan. 12.
 Transition from Steam to Electricity at Deer Lodge Shops.* E. Sears. (18)
 Jan. 12.
 Conclusions of Screw Spike and Tie Plate Test of Pennsylvania R. R. (86)
 Jan. 16.
 Railway Construction and Operation in the Fighting Zone in France. Leslie F.
 Van Hagan. (Abstract of address before Freshmen Class in Eng. at Univ. of
 Wisconsin.) (86) Jan. 16.
 Locomotive Feedwater Heating.* (15) Jan. 18.
 Methods of Loading Lumber in Open Top Cars.* (15) Jan. 18.
 Solidification as a Factor in Railway Valuation. H. M. Taylor. (15) Jan. 18.
 Developments in Railway Valuation. H. C. Phillips. (18) Jan. 19.
 Track Elevation Work of the P. C. C. & St. L. Ry. in Cincinnati.* (18) Jan. 19.
 Oxy-Acetylene and Electric Welding and Cutting, Processes in Locomotive Works.
 A. F. Dyer. (Paper read before Canadian Railway Club.) (86) Jan. 23;
 (96) Jan. 10; (18) Feb. 9.
 Pneumatic Mixer Train on Mount Royal Tunnel.* F. C. K. Stuart. (13) Jan. 24.
 Railway Station is Combined with Tail Office Building.* (13) Jan. 24.
 Concrete Highway Crossings.* (15) Jan. 25.
 Mikado Type Locomotive for the Santa Fe System.* (15) Jan. 25.
 New Night Lights for Pullman Cars.* (15) Jan. 25.
 The Baghdad Railway and Its Part in the War.* H. Charles Wood. (Abstract
 of paper read before Am. Geographical Soc.) (15) Jan. 25.
 The Economics of the Chinese Railways.* (11) Jan. 25.
 The New Pennsylvania Entrance into Indianapolis.* (15) Jan. 25.
 An Early Experimental Study of Rail Wear.* R. C. Cram. (17) Jan. 26.
 Articulating Manganese Crossings for Longer Life.* (17) Jan. 26.
 Relation Between Average Life of Ties and Percentage of Renewals. Mabel E.
 Thome. (18) Jan. 26.
 Scrap Reclamation on the Atchison, Topeka & Santa Fe Ry.* Charles E. Parks.
 (18) Jan. 26.
 Welded Rail Joints.* Martin Schreiber. (17) Jan. 26.
 Coal Car Thawing Plant Built of Precast Concrete Units.* Scott W. Linn. (13)
 Jan. 31.
 A 100-Ton Coal Car for the N. and W.* B. W. Kadel. (25) Feb.
 C. M. and St. P. Fifty-Ton Gondolas.* (25) Feb.
 Microscopic Study of Welded Tires.* S. W. Miller. (25) Feb.
 N. Y. C. 4-8-2 Type Freight Locomotives.* (25) Feb.
 Pennsylvania Electric Locomotives.* (25) Feb.
 Reinforcing Wooden Furniture Cars.* (25) Feb.
 Replacing Men with Mechanical Equipment.* (87) Feb.
 Santa Fe 2-8-2 Type Locomotive.* (25) Feb.
 Scientific Management in Track Work.* (87) Feb.
 The Tank Car in Interchange.* E. S. Way. (Abstract of a paper read before
 the Car Foremen's Assoc. of Chic.) (25) Feb.
 Hopper Bottom Gondola Cars for C. M. & St. P.* (15) Feb. 1.
 Most Powerful Electric Passenger Locomotives.* (15) Feb. 1.
 The Trans-Continental Railway of Australia.* (15) Feb. 1.
 British Built Ambulance Train for the American Expeditionary Force.* Fred-
 erick C. Coleman. (18) Feb. 2.
 Modern Tendencies in Locomotive Design.* Louis E. Endsley. (Paper read before
 Section D of the Am. Assoc. for the Advancement of Science.) (18) Feb. 2.
 New Passenger Locomotive for the St. Paul. (17) Feb. 2.
 Frisco Railway Tries Cylindrical Coaling Stations. (13) Feb. 7.
 British Ambulance Train for American Wounded.* (15) Feb. 8.
 Norfolk and Western Hopper Car of 100 Tons Capacity.* B. W. Kadel. (15)
 Feb. 8.
 Pennsylvania System Rejects Screw Spikes.* (15) Feb. 8.
 Individual Fuel Performance Records, Baltimore & Ohio R. R. W. L. Robinson.
 (Paper read before New England R. R. Club.) (18) Feb. 9.
 Locomotive Front End Spark Arrester.* (15) Feb. 15.

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Railroads—(Continued).

- Shifting a 4 000 Ton Bridge on Freight Car Trucks.* (15) Feb. 15.
 Electric Tractors and Trucks in Freight House Service.* (18) Feb. 16.
 Maintenance of Railway Turntables. G. C. Lightner. (18) Feb. 16.
 New Freight House for the Illinois Central R. R. at Champaign, Ill.* (18) Feb. 16.
 New Freight Terminal of P. C. C. & St. L. Ry., at Indianapolis.* (18) Feb. 16.
 The Markham Yards, Illinois Central R. R.* (18) Feb. 23.
 Powerful British-Built Express Passenger Locomotive.* Frederick C. Coleman. (18) Feb. 23.
 Problems in Track Maintenance. F. B. Tapley. (Abstract of paper read before Canadian Railway Club.) (18) Feb. 23.
 Les Tramways Electriques d'Alger.* P. Caufourier. (33) Jan. 12.
 Das neue vereingte Reibungs-und Zahnbahn-System Peter.* S. Abt. (107) Serial beginning Jan. 5.

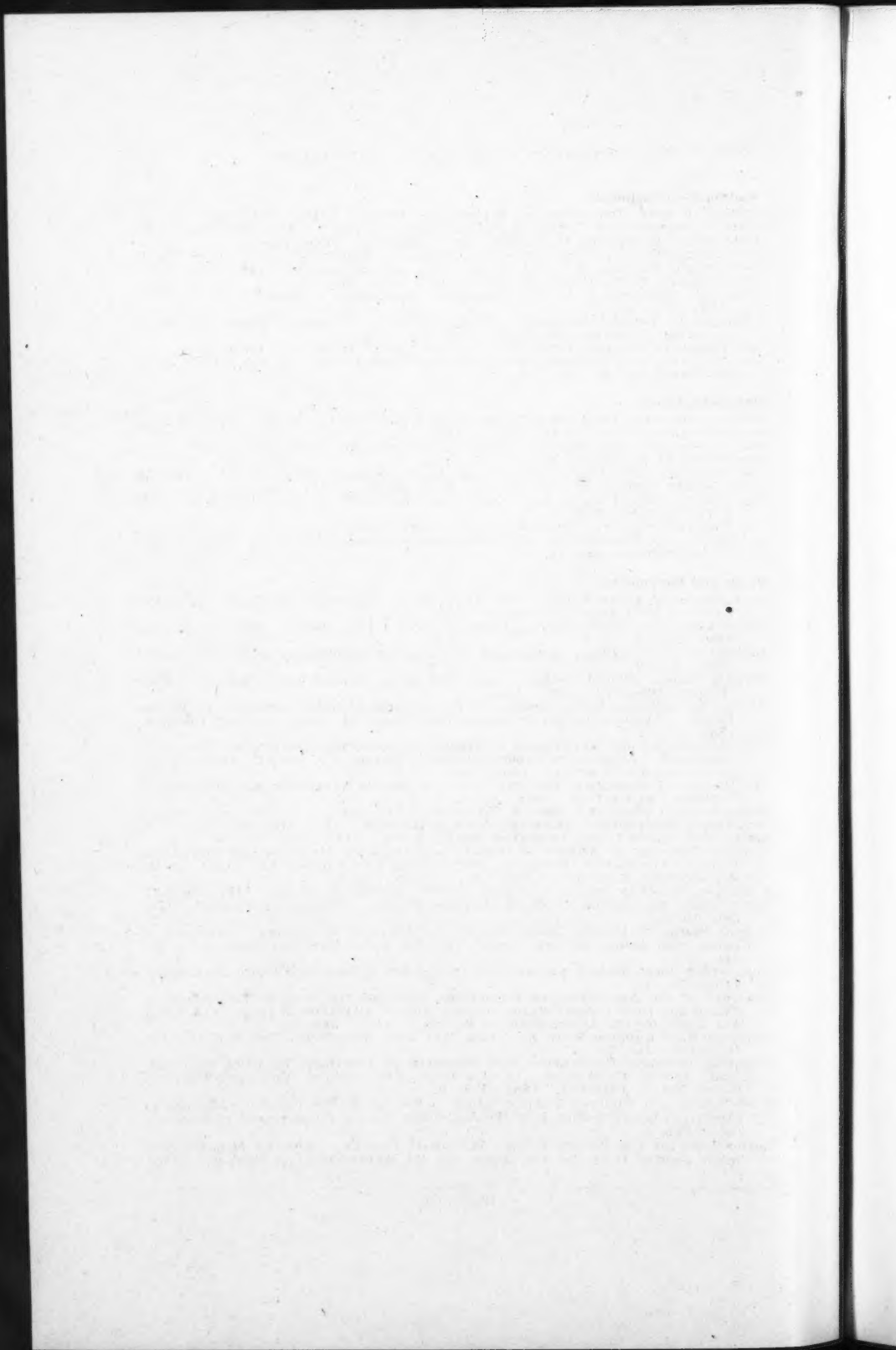
Railroads, Street.

- Determining Stray Power of a Transmission Line.* D. D. Ewing. (17) Jan. 12.
 Electric Railway Power at Montreal.* (17) Jan. 12.
 Experiences with Interurban Car Axles. A. B. Metcalfe. (17) Jan. 12.
 Advantages of Mechanical Ties.* (17) Jan. 19.
 The Front-Entrance, Center-Exit Car and Higher Schedule Speed.* (17) Jan. 19.
 Light-Weight Safety Cars Best for All. W. G. Kaylor. (17) Jan. 26.
 Car Axles—Their Design, Manufacture and Service.* Norman Litchfield. (17) Serial beginning Feb. 2.
 The Twentieth Century Trolley Hospital.* (46) Feb. 2.
 L'Aération des Chemins de Fer Métropolitains Souterrains.* A. Goupil. (33) Serial beginning Jan. 19.

Roads and Pavements.

- Maintenance of Earth Roads. John H. Mullens. (Abstract of paper read before Assoc. of State Highway Officials.) (86) Jan. 2.
 Methods and Cost of Constructing Kentucky Rock Asphalt Road.* Wm. S. Canning. (86) Jan. 2.
 Methods of State Highway Department of Maine for Maintenance of Gravel Roads.* (86) Jan. 2.
 Military Roads. Wm. D. Sohler. (Abstract of an address before Assoc. of State Highway Officials.) (86) Jan. 2.
 Recent Developments in the Design and Construction of Road Surfaces. H. Eltinge Breed. (Abstract of paper read before Assoc. of State Highway Officials.) (86) Jan. 2.
 The Construction and Maintenance of Highways Under War Conditions. Arthur H. Blanchard. (Abstract of paper read before Section D of the Am. Assoc. for the Advancement of Science.) (86) Jan. 2.
 The Proposed Illinois State Highway System a Notable Advance in the Financing of Highway Construction. (86) Jan. 2.
 Sanitary Street Cleaning.* Geo. A. Wiseman. (96) Jan. 3.
 Condition of Road Surface Outweighs Type of Bitumen. (13) Jan. 10.
 Rattler Test Called Unfair to Shallow Paving Brick. (13) Jan. 10.
 Relative Efficiency in Methods of Repairs to Bituminous Macadam and Bituminous Concrete Pavements. George H. Biles. (Paper read before Am. Assoc. for the Advancement of Science.) (96) Jan. 10; (86) Feb. 6.
 A Concrete Roadway System in a Shop Yard.* Charles E. Parks. (15) Jan. 11.
 Rattle Tests for Paving Brick of Various Depths. William C. Perkins. (76) Jan. 15.
 Present Status of Granite Block Pavements. Clarence D. Pollock. (Abstract of paper read before the Am. Assoc. for the Advancement of Science.) (96) Jan. 17.
 Stone-Filled Sheet Asphalt Suffers from Inattention to Detail. Clifford Richardson. (13) Jan. 17.
 Efficiency of the Application of Bituminous Materials for Surface Treatments on Gravel and Broken Stone Roads. Julius Adler. (Abstract of paper read before Am. Assoc. for the Advancement of Science.) (96) Jan. 24.
 American Road-Building Work in French War Zone Organized. Robert K. Tomlin, Jr. (13) Jan. 31.
 Financing Pavement Construction and Renewals, as Illustrated by Utica and Portland. George C. Warren. (Transactions, Am. Soc. of Municipal Improvements, Vol. I, 1917-18.) (86) Feb. 6.
 Motor Trucks and Highway Transportation. Maurice B. Greenough. (Abstract of paper read before Section D of the Am. Assoc. for the Advancement of Science.) (86) Feb. 6.
 Rattler Tests for 3 In. Paving Brick. William C. Perkins. (Abstract of paper read before Section D of the Am. Assoc. for the Advancement of Science.) (86) Feb. 6.

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- Rhode Island Practice in Construction of Bituminous Macadam. I. W. Patterson. (Abstract of paper read before Providence Eng. Soc.) (86) Feb. 6.
 The North Carolina State System of Road Maintenance.* (86) Feb. 6.
 The Saint Augustin-Quebec Road.* C. A. Mullen. (96) Feb. 7.
 Wood-Block Pavement Failures of Southern Cities Analyzed.* C. H. Teesdale. (Abstract of paper read before Am. Wood Preservers Assoc.) (13) Feb. 14.

Sanitation.

- Cost of Industrial Health Supervision. Reginald Trauttschold. (9) Jan.
 Effect of the War on the Production of Garbage and Methods of Disposal.* I. S. Osborn. (Abstract of paper read before Am. Public Health Assoc.) (96) Jan. 3.
 Definitions of Terms Used in Sewerage and Sewage Disposal Practice. (From Report of Sanitary Eng. Section of the Am. Public Health Assoc.) (86) Jan. 9.
 The Activated Sludge Experiments at Pasadena, Cal.* (Abstract of Report of Board of Engrs.) (86) Jan. 9.
 The Diffusion of Sewage. Kenneth Allen. (Abstract of article in *Polytechnic*.) (86) Jan. 9; (96) Jan. 24.
 Coagulant and Filters Remove Oily Tastes and Odors. (13) Jan. 10.
 Efficiency of Storm-Water Sewers Depends on Inlets.* Irving P. Kane. (13) Jan. 10.
 Heating Homes in Such Manner as to Keep the Body Warm and the Air that is Breathed Cool. J. P. Conroy. (Abstract of paper read before New England Section of the National Commercial Gas Assoc.) (24) Jan. 12.
 Malaria-Control Engineering in Texas Increases Labor Efficiency.* Charles Saville and H. W. Van Hovenberg. (13) Jan. 24.
 Curing Faulty Furnace Systems.* H. B. C. (101) Feb. 1.
 Capacity of Toronto Refuse Destructor Exceeds Contract Provision.* I. S. Osborn. (13) Feb. 7.
 Operating the Rector Gas Heating System.* George S. Barrows. (Abstract of paper read before Am. Soc. of Heating and Ventilating Engrs.) (24) Feb. 9.
 What We Do and Don't Know About Heating. John R. Allen. (Paper read before Am. Soc. of Heating and Ventilating Engrs.) (64) Feb. 12.
 Durability of Cement Drain tile and Concrete in Alkali Soils. (Abstract of *Technologic Paper No. 95*.) (86) Feb. 13.
 Methods and Cost of Pressing Sewage Sludge. Kenneth Allen. (Abstract of paper in Vol. 1, *Transactions*, Am. Soc. of Mun. Improvements.) (86) Feb. 13.
 Recovery of Grease and Fertilizers from Sewage Comes to the Front. (13) Feb. 14.
 Heating Equipment of a Western High School.* (101) Feb. 15.
 Depth—the First Consideration in Drainage Ditches.* Richard L. Longshore. (13) Feb. 21.

Structural.

- Concrete Materials and Design of the New Buildings of the Massachusetts Institute of Technology, Cambridge, Mass.* Sanford E. Thompson. (109) Jan.
 Foundations of the New Buildings of the Massachusetts Institute of Technology, Cambridge, Mass.* Charles T. Main and H. E. Sawtell. (109) Jan.
 Acres of Shops to Form Ordnance Base in France.* (13) Jan. 3.
 Build Hundred and Ten Inch Plate Mill in Six Months.* (13) Jan. 3.
 Merchants Shipbuilding Corporation at Bristol, Penn.* (13) Jan. 3.
 Portable Houses for Overseas Forces Built in Record Time by New Methods.* (13) Jan. 3.
 Spalling of Reinforced Concrete in Moist Location.* F. E. Turneaure. (13) Jan. 3.
 The Manufacture of Pattern Castings.* Henry M. Lane. (20) Jan. 3.
 American Roofing Plates Have no Superior.* (101) Jan. 4.
 Camp Dix Military Cantonment near Wrightstown, New Jersey.* (64) Jan. 8.
 Travelling Towers Place 92 000 Yards of Concrete.* (13) Jan. 10.
 Union Pacific Adopts Unit-Member Concrete Snowsheds.* W. R. Armstrong. (13) Jan. 10.
 Chimney Size and Air for Fuel Combustion.* (101) Jan. 11.
 Hollow Tile as a Factor in Fire Prevention.* Walter A. Hull. (76) Jan. 15.
 Suspended Templets and Their Application.* Terrell Croft. (64) Jan. 15.
 Driving Concrete Piles by Well Drilling Method.* J. L. Harrison. (86) Jan. 16.
 Design of Restrained Beams Carrying Hydrostatic Load.* E. H. Darling. (96) Jan. 17.
 Land Big Drop Shaft on Seal and Curb Wall.* (13) Jan. 17.
 Portable Units Form Buildings for Labor Camps.* (13) Jan. 17.
 A Modern Granary.* (73) Serial beginning Jan. 18.
 Graphical Method of Finding Moments in Continuous Frames of a Girder and Two Fixed Columns.* W. S. Wolfe. (86) Jan. 23.

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Structural—(Continued).

- Scientific Principles Involved in Building a Building Code. John A. Ferguson. (Abstract of paper read before Am. Assoc. for the Advancement of Science.) (86) Jan. 23.
- Simple Formulas for Rapid Design and Estimates of Flat Slab Based on the Last Joint Committee Report on Concrete and Reinforced Concrete. M. W. Serby. (86) Jan. 23.
- The New Chicago Rules for Design of Reinforced Concrete Slab Floors. (86) Jan. 23.
- Market and Warehouses Form Large Building Group.* L. A. Waterbury. (13) Jan. 24.
- Railway Station is Combined with Tall Office Building.* (13) Jan. 24.
- Coal Car Thawing Plant Built of Precast Concrete Units.* Scott W. Linn. (13) Jan. 31.
- Precast and Field-Cast Concrete Houses.* J. B. Warriner. (45) Feb. 2.
- One-Hundred-Foot Concrete Arch Carries Theater Balcony.* Clarence W. Driver. (13) Feb. 7.
- Sheet Metal Work for Army Cantonments.* (101) Feb. 8.
- Concrete Army Warehouses Built in Record Time.* Edgard H. Mosher. (13) Feb. 14.
- Ordnance Factory 710 by 140 Feet Built in Three Months.* Harold Greenleaf. (13) Feb. 14.
- Proportioning Skylight and Window Areas.* M. William Ehrlich. (101) Serial beginning Feb. 15.
- Three Wooden Buildings to Hold 10 000 Government Employees.* (13) Feb. 21.
- Graphisches Verfahren zur Ermittlung der elastischen Linie. E. Dolder. (107) Jan. 19.

Topographical.

- City Survey Monuments.* H. L. Seymour. (96) Jan. 3.
- Die Nivellements hoher Präzision und die internat. Vorschriften ihrer Fehler-Berechnung.* F. Baeschlin. (107) Serial beginning Jan. 5.

Water Supply.

- Some Canadian Pumping Plants.* A. Huguenin. (96) Jan. 3.
- Waterworks Laboratories. J. J. Hinman, Jr. (Extract of paper read before Iowa Section of the Am. Water Works Assoc.) (96) Jan. 3.
- Irrigation Scheme on the River Murray, South Australia.* (12) Jan. 4.
- War-Time Value of Hydroelectric Power. Henry I. Harriman. (27) Jan. 5.
- Card System for Recording Location of Water Mains, Valves, etc. (86) Jan. 9.
- Combined Water Purification and Softening Plant of Great Falls, Mont.* (86) Jan. 9.
- Presumptive Test for B. Coli. Max Levine. (Abstract of paper read before Iowa Section of the Am. Water Works Assoc.) (86) Jan. 9.
- Evaporation from Water Surfaces. R. B. Sleight. (Abstract of article published in *Journal of Agricultural Research*.) (86) Jan. 9.
- The Basis of Water Charges in Urban Areas from the Point of View of Common Utility. E. C. Rodda. (Abstract of paper read before Municipal Waterworks Assoc.) (96) Jan. 10.
- The Flow of Water in Siphons.* Mark Halliday. (Abstract of paper read before North of England Inst. of Min. Engrs.) (96) Jan. 10.
- Notes on Water Supplies as Sources of Power. Cecil H. Roberts. (Abstract of paper read before the Inst. of Water Engrs.) (96) Jan. 17.
- Floating-Crest Gates Used on Sherburne Lakes Dam.* (13) Jan. 17.
- Demolition of the Ragged Rapids Dam.* Sidney Bowen. (96) Jan. 17.
- Making and Placing Ten Miles of Concrete Pipe for Winnipeg Aqueduct.* K. B. Kumpe. (13) Jan. 17.
- Helping France to Help Herself: Hydroelectric Power Can Supplant Her Coal Supply Better Than It can be Done by More Ships, and American Emergency Construction can Provide Such Plants in from Six to Nine Months.* Alexander C. Clogher and Victor F. Hammel. (27) Jan. 19.
- Drainage of Irrigated Lands.* J. L. Burkholder. (Abstract from *Reclamation Record*.) (96) Jan. 24.
- Effect of Mouthpieces on Flow of Water. (96) Jan. 24.
- Irrigation Project is Based on Economic Use of Water. (13) Jan. 24.
- Problem of Backwater.* Roméo Morrisette. (96) Jan. 24.
- The Cabbage Tree Creek Reservoir for Brisbane Water Supply.* (12) Jan. 25.
- Water Power in Great Britain. Alexander Newlands. (29) Jan. 25.
- War Service in Agriculture.* (111) Feb. 1.
- High-Head Francis Turbines and Their Operating Records.* Arnold Pfau. (111) Feb. 1.
- Improvements in Water Softening Practice on the Chicago & Eastern Illinois R. R. *William Henry Hobbs. (18) Feb. 2.

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- Hydro-Electric Development. Calvert Townley. (96) Feb. 7; (17) Jan. 26.
Largest High-Head Francis Turbine.* Arnold Pfau. (64) Feb. 5.
Cost of Operating Electric Pumping Plants in Iowa. H. W. Wagner. (86) Feb. 13.
Irrigating Florida Fruit Grove by the Air Lift System.* John Oliphant. (86) Feb. 13.
Why Chicago Should Meter Its Water. (Abstract of report of Chicago Bureau of Public Efficiency.) (86) Feb. 13.
Machine Trenches 220 Feet an Hour in Shale.* (13) Feb. 14.
The Most Powerful Turbine in the World.* F. Schmidt. (111) Feb. 15.
Earth Dam Has Screened Gravel Core and Pipe Drains.* L. V. Branch. (13) Feb. 21.
Mixing Baffles Cut Down Chemicals at Jackson, Miss. John R. Baylis. (13) Feb. 21.
Will Cost Half Million to Make Austin Dam Usable.* (13) Feb. 21.
Building a Dam of Concrete Slabs.* J. F. Springer. (46) Feb. 23.

Waterways.

- Drive 15 000 Piles for Pair of Thousand-Foot Shipways.* (13) Jan. 3.
Redredging—Will It Pay?* Walter H. Gardner. (16) Jan. 5.
Calissons and Cribbs for Lighthouse Foundations. (13) Jan. 10.
Methods and Cost of Constructing Reinforced Concrete Pier Shells for Balboa Docks.* R. Z. Kirkpatrick. (86) Jan. 16.
New Ocean Freight Terminal Started on Staten Island.* (13) Jan. 17.
Concrete Plant on Boston Dry Dock Almost Automatic.* Edmund M. Blake. (13) Jan. 31.
Common Use of Records of Minimum Stream Flow is Pernicious. George F. Ladshaw. (13) Feb. 21.
Les Ports français et la Guerre; les Ports de l'Algérie occidentale, Oran, Mostaganem, Alger et Ports Secondaires.* Auguste Pawlowski. (33) Jan. 26.
Mittellungen über Versuche zur Verhütung von Kolken an Wehren.* H. E. Gruner and Ed. Locher. (107) Serial beginning Jan. 19.